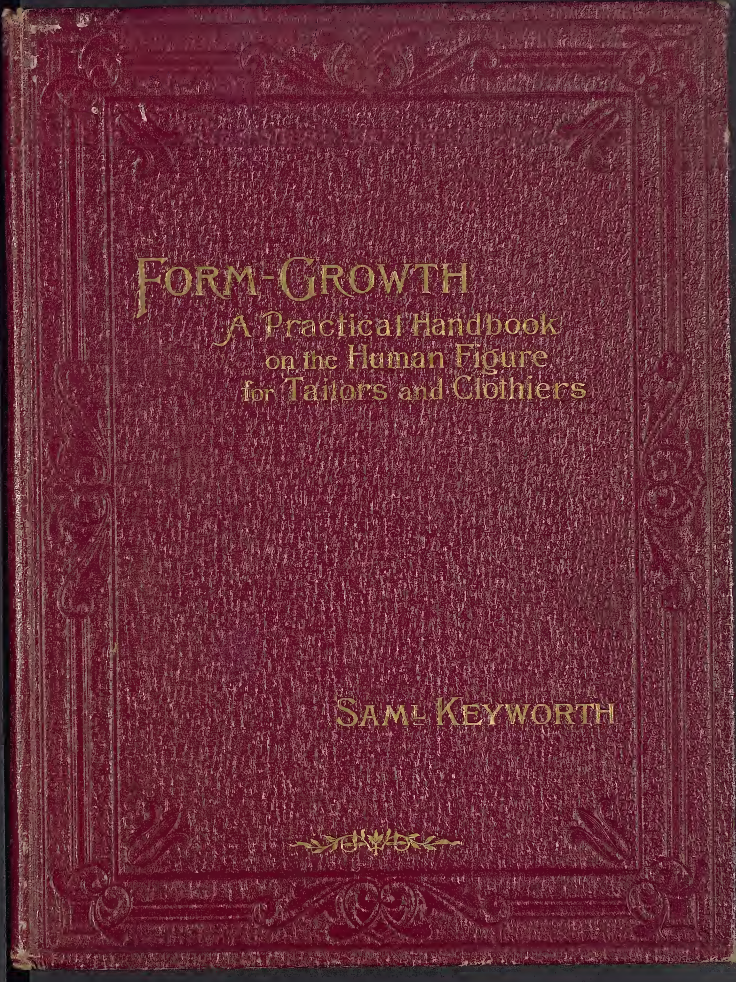

FORM-GROWTH

A Practical Handbook on the Human Figure for Tailors and Clothiers

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FORM-GROWTH.

A PRACTICAL HANDBOOK ON THE HUMAN FIGURE.

A BOOK FOR

TAILORS, CLOTHIERS AND COSTUMERS,

BY

SAMUEL KEYWORTH.

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1895.

" New occasions teach new duties,
Time makes ancient thought uncouth;
He must upward still and onward
Who would keep abreast of truth."

J. R. Lowell.

" Structure is of more importance than general size. Provide for Form and give it a limit."

D. J. Jones, *in " West-End Gazette."*

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PREFACE.

THE following pages have been written chiefly for Tailors, Clothiers, and Costumers; the earlier sections, however, may be read by anyone who takes an interest in the growth of the Human Form. The Author is fully aware that with the majority of men and women who are compelled by the exigencies of modern commercial pressure to seek technical information, such information is sought for with a practical pecuniary end in view. To them, therefore, it must be presented in a brief, clear business-like form. He has tried to bear this in mind in the arrangement of the work, so that the more theoretical sections may be clearly distinguished, and, if preferred, avoided altogether. But there are others, especially young men, who, in these days of intellectual progress, feel differently. They are not satisfied with bare statements, they wish to know the reason why, and do not shrink from trouble if they can but make the requisite knowledge their own. If a subject, necessarily dry, can be made at once both useful and interesting to such students all the better. This object has been aimed at.

A portion of the work consists of a series of Rules, Tables, and Lists. It is needless to say they are the result of considerable experience and investigation. They ought to be of very great value, and will be, if properly and intelligently used.

An important idea throughout the book has been to remind its readers that there are Laws of Growth in the human body, and that some acquaintance with these laws is a useful branch of knowledge for those engaged in the clothing trades; but the *chief object* has been to compile a work which shall, if studied, lead the inquirer on step by step, little by little, to a knowledge of Form-growth. The Theory, the Standards, the Rules, the Tables, and the Lists are merely means to an end, not to be regarded as final, rigid, or infallible of themselves, but rather such as *primers* or *principias* are to the one who learns a language. At the same time the Rules and Tables are as correct as the Author can obtain or present them.

Any correspondence dealing with the subject treated of would be welcomed by the writer, and he would respectfully remind his more experienced readers that friendly co-operation in the way of correspondence is more likely to advance a sound knowledge of Form-growth than merely looking for perfection.

West-End School of Cutting,
33 Warwick Street, Regent Street, W.

INTRODUCTION.

In the art of clothing the Human Figure two elements are necessarily found: a knowledge (more or less) of the Form itself, and some systematic method of clothing it. The first has to do with the *model to be draped;* the second, the *way to drape it.* Hitherto the trade literature of tailors has been chiefly devoted to the last named, *i.e.*, systematic drafting. There has been much labour wrought on numerous systems, resulting in their gradual improvement; but the time has now come when more attention should be given to our model. Few writers, except Dr. Wampen, have helped us much in this domain of knowledge. Little effort has been made to lay hold of the scattered information available, and to incorporate it systematically for our daily practical use. But all in good time. We may now hope to take a step in advance, because the two essential conditions for such work were never more favourable than now. These conditions are: the rapid growth of knowledge now brought within arm's-length of every man, and the collateral fact that tailors are more qualified mentally to follow the inquiry.

Importance of Form-Knowledge.

Everyone acquainted with the subject knows perfectly that this is requisite to the tailor. The practical man soon finds that this knowledge is really his *greatest need.* It constitutes, in reality, a large part of what we call his *experience.* By it he judges the products of his system, and detects its correspondence with the requirements of his model. Frequently a man of common sense and keen observation is decidedly ahead of the mere scientist, because from constant practice "he knows his man." Students in books of cutting are repeatedly urged to *photograph* the shape of their client in their mind's eye. And further, we are told that the best routine of measurement is that which will indicate not only *size* but *form*, and experienced men select their measures with this end in view. All this shows that the importance of Form-knowledge is fully recognised. Indeed it is *the* most difficult part of our business, therefore any additional light that will help us to attain it ought to be of the greatest practical use.

But besides its utility, we think the study of Form will be found to be extremely interesting. It is clearly a branch of science, and for this reason is able agreeably to engage the attention of those who perseveringly follow it.

AN ILLUSTRATION.

To illustrate this point take the science of Geology, which may be reasonably regarded as in itself a study of Form; except that in this instance the object of investigation is not the human model but the great world itself. To the Geologist Mother Earth is no longer silent, but has found a voice by which she intelligently speaks to him. Her wrinkled crust, with its varying strata, the winding river-bed, the scooped out valley and the rocky hill, the tiny rivulet or the giant ocean, are all so many *tomes* full of meaning to him. They are not merely scenes of beauty, but volumes of instruction; and the student of Nature, as he sees all the present formative forces at work, can not only conjure up the wondrous past, but can deduce all kinds of useful practical lessons for every-day life. Details which are nothing to an ordinary observer to him are pregnant with interest. Nothing is unimportant, nothing isolated. All are links in a long chain of continuity—parts of a stupendous mechanism. Indeed, as our minds enlarge and we become acquainted with any new subject, a new world opens to our view—a world not of utility alone, but one of pleasure.

If, then, the morphology of the inanimate Earth be so engaging to the student, may we not expect that a kindred delight will reward those who study Form as exhibited in that most wonderful of all economics—the Human Body?

ANOTHER ILLUSTRATION

May be found in the modern investigation among Botanists as to the "Making of Flowers." Scientists now try to tell us not merely of the classification and characteristics of flowers, but *why* they assume their colours and shapes and perfumes. Of course it is a complex inquiry, but when lucidly dealt with it is found to yield abundant interest. And surely if these men can devote so much time and thought to so fanciful a subject, we ought to be willing to give the requisite application for finding out, if it be possible, how the human body grows. In doing so we may be quite sure that our labour will bring its reward; our pathway of daily practice will be levelled and straightened, as well as bestrewn by flowers of pleasure, perfumes of delight, and buds of expanding thought.

A WORD TO CLOTHIERS.

The changed conditions under which the whole range of clothing is now made—conditions demanding rapidity of production and large quantities, with improved adaptation to each general type of figure—necessitates a keener classification of natural forms with their dimensions. Breast measure as indicating size is insufficient. The usual peculiarities must be provided for: long and short necks, round and flat figures, degrees of stooping, difference in length of limbs, corpulence, &c. The objection once urged against such a course by merchants—that it meant a large stock and sinkage of capital—our growing wealth and increase of commerce themselves remove.

Another incentive to the same method is that a large amount of so-called bespoke work is now made under wholesale conditions. Cross sizes and abnormal shapes have therefore become a necessity. Measure and pattern cutters in large houses now find it essential to pay greater attention to figure-growth if they would be up to date.

A WORD TO COSTUMERS.

The female form has been dealt with in the present work. In ladies' clothing Art, always elastic, is more outwardly prominent than rigid science, but they are inseparably connected. The former are the branches and foliage, the latter is the root; therefore figure-growth is required as a foundation for the costumer.

THE "REIGN OF LAW."

I've heard them say that through the whole expanse
Of Nature's vast and limitless domain,
No life, no action is resigned to chance,
But everywhere and always Law doth reign.

Those mighty orbs which pierce the midnight sky,
Winging their flight through endless stellar space,
Law marks their orbits through infinity,
And limits every motion of their race.

Not less the tiny tear-drop, trickling down
The furrowed cheek of sorrow or remorse,
That same imperious potency must own,
And yield obedience to its mystic force.

Our words—these are but hurried transient sounds;
A moment's space they agitate the air,
Yet is the briefest kept within its bounds
By laws which govern it with nicest care.

Our common flowers that by the hedges grow
Vary in form, in colour, in perfume.
Sunshine and shower descend, light breezes blow,
And rule each flow'ret's shape, its tint, its bloom.

So with the human frame—its form, its size,
Its gait, its attitude, have all a cause;
Its features, facial lines, colour of eyes,
Are fixed and fashioned by identic laws.

We feel no thrill of anger, joy or pain;
No thought disturbs the tenor of our mind;
No sense-vibrations travel to the brain
But leave some impress of their force behind.

No sound-waves strike the membrane of the ear,
No nerves give sense of touch, however tame
The retina takes no view, misty or clear,
But "Form" is left upon our outer frame.

PART I.

FORM-GROWTH CONSIDERED THEORETICALLY.

SECTION I.

THE LAW OF DIVERSITY.

What is the human form? Of that form it may be truly said that there is nothing like it in nature. It is a principle among biologists that *the higher the type the greater is the diversity*, and as the human is the highest type known to us in the ordinary way, so does it reveal itself as more diversiform than any inferior order. Our body is a microcosm—a world in miniature—as the old schoolmen taught, and as modern science confirms, having affinities with every substance in the physical world. We must think of it, not as a solid, impervious to all surrounding forces, but as consisting of separate atoms, with minute interstices, through and around which these forces continually play. Moving unceasingly these same atoms vibrate in response to Nature's subtle powers, and their mutual action leaves its impress on the physical frame. True, all this life-movement is silent and mysterious, but it is none the less real and abiding, ever acting directly or indirectly towards the formation of the body. Three distinct agents are said to operate as builders of our external encasement—the soul within, our environment, and our pre-natal conditions. Taking form initially from that inner self, continually modified by its own changeful surroundings, and further urged or checked by pre-natal magnetisms, each body assumes as it were a new individuality for itself. These three agencies formatively acting on the outer frame unite to make up the great **Law of Diversity,** such as we see manifested before us in unending variety of type day by day. These it is which give us a distinction all our own, making each person outwardly different from his fellow—in face, form and limb, in voice, step and manner.

Were we writing a book on theoretic development we might pursue this subject of Diversity in Form-growth to almost any length; but such not being our object it is only necessary to direct attention to it, and chiefly so that it may appear in contrast with another important law which operates in connection with it.

SECTION II.

THE LAW OF CONTROL.

The last section dealt with a wondrous truth, namely, the existence of an endless variation in human forms. Side by side with it we have now to consider another fact—equally important, and standing as a corrective to the former—it is as follows, that this variation is subject ever to laws of limitation and control. What these laws are in detail we cannot at present understand, but we see the conserving effect of their working. As an illustration let us think for a moment of one part of the body—the face. We are all acquainted with the very remarkable fact that among earth's millions there are no two faces identically alike. Resemblances are struck, family likenesses strongly marked, but the law of distinction is never broken. There are traceable those triple formative agencies referred to in our former section. First the soul transmitting its individuality on its outer envelope; second that individual's environment reflecting in visible matter all the detail of every-day life; and third, the parental features carried on in a line of continuity. These co-operate and converge to build up a new countenance. At the same time this most varying result is included in the small surface-space of a few inches. Here then is clear limitation of *size*. All this endless design, and yet enclosed within so insignificant an area.

But besides the **law of size** there is another at work—the **law of proportion.** It is well known that painters and sculptors who deal with the human figure, have their set proportions for the face, and in adopting such they are but following on nature's own lines. Further, there is a **law of correspondence** by which the facial surface bears a resemblance to the entire form. There is also a **law of symmetry** by which one-half the form resembles its other half. These and other laws are ever controlling, checking, and limiting within nature's prescription the action of those threefold forces previously spoken of. These last mentioned are the centrifugal, while the former constitute those centripetal powers which, ever acting in beautiful counterpoise, maintain a perfectly orbital growth. As it is in the human face so with the whole body. Once grasp the existence of these counteracting laws—that of diversity, and that of control—and we may easily reduce our knowledge to practical result. We may, for instance, now understand the conflicts of view held by practical cutters as to

ADMEASUREMENT *v.* BREAST MEASUREMENT.

Both methods are defensible because both are based on solid facts of nature. Advocates of the first find their foundation in the principle of diversity; friends of the second use as their base its correlative, the principle of proportion and control. We hope, as we proceed step by step, to gather some useful information respecting these laws and to inquire how they govern form-growth, and peculiarities of figure.

SECTION III.

THE BEGINNINGS OF ANTHROPOMETRY.

The word Anthropometry is of Greek origin. From Αηθροπος (anthropos), one of the Greek words for man, and μετρον (metron) a measure. It means therefore Man-measurement. Like all other branches of Science it had a humble beginning, and the best way of understanding it is to know something of it historically. Not only so, but the historic is almost always the most interesting method of mastering a subject.

The genesis of Man-measurement is lost in the

"Dim and dusk of early time,"

but investigations which have been carried on in recent years enable us partially to pierce that perplexing obscurity. The necessary light is gathered from two sources, one from Language (Philology), the other from Archæology. We shall have to push back our research to almost pre-historic times. Taking in one hand, as it were, the "Duplex Lamp" just mentioned, and with a slight demand on our imagination, we may for a moment disperse the gloom, and through the rift distinctly see the ancient cave-man as he toils laboriously at his rude dwelling, fashioning his tools and weapons or making his clothes.* As he advances slowly in thought and ability he feels the want of some standard measurement so as to repeat his former efforts. Where shall he find it? How can he get it? Well, it dawns upon him, as the outcome of his common observation, that certain parts of his own and others' limbs are nearly of uniform size. His hand and his arm are the agents with which he works. How natural therefore to measure with these. He has noticed that men's arms do not vary very much in length. Unconsciously, yet in obedience to that law of inference by which we all add to our own knowledge, he **uses his arm as a standard.** It was a rule close at hand, ready for immediate use, and he simply picked it up. And—if the arm and hand, why not the fingers, either close together or stretched (spanned) out? Then in longer distances it would merely be an extension of idea to use the foot or the step as standards. If he would know the girth of a tree, or an animal, or a block of stone, what more easy or natural than to embrace it with his enfolding arms? Hence these dimensions would in time become his recognised standards of measurements. But none of us ever actually beheld primitive man so engaged; is it not therefore mere imagination, unwarrantable assumption? No! Language in all its strange retentiveness photographs for us these long past scenes. It so happens that the most ancient standard of measurement known is the cubit, *i.e.*, the forearm. It was known and used among the Jews, and before them the Assyrians, Babylonians, and Egyptians. One day more than 3000 years ago an Egyptian mechanic, while employed on the beautiful Temple of Karnak, carelessly left his rule in an opening in the masonry. It was found recently. Examination showed it to be a two-cubit rule. This again is the exact measurement of the entrance to the pyramid of Ghizeh, which fact of discovery introduces us to much of the colossal grandeur of Egyptian architecture.

Another name for an old standard is a **digit,** or a finger's breadth. Another was a **palm,** a hand's breadth, now fixed at four inches, and still used for measuring horses. So also a **span,** a **foot,** a **pace,** and even our **mile** is connected with the human body, it is from what the Romans called **mille passus,** a thousand paces. So with the classic race-course, the **Stadium,** which was said to be 600 (Hercules) feet long. Our words **yard** and **fathom,** though long since fixed quantities, when traced back tell us the same story. They are the embrace of a man, the enclosure of his arms. Again, that measurement so familar to tailors —the inch—was originally a thumb—the connection may still be seen in the French language. Nor does this series exhaust the list. But it will be sufficient to show us that the root of what has since budded and blossomed into the science of man-measurement was of the most primitive kind. But it was a root after all. It evolved from a truly natural soil containing within itself all the potential promise of future growth.

We have further collateral evidence of such an origin in the history of numbers, the science of which began, not in the elaborate work of Euclid or of Arabian savants, but from the simplest digital reckoning. The fingers were the first decimals and were demonstrators of numbers ere the thought of recording figures had been acquired.

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* See Fletcher's interesting Lecture on Anthropometry.

SECTION IV.

PROGRESS OF ANTHROPOMETRY.*

As time progressed it was found that these standards of nature varied, and as more exactitude became necessary efforts were made to get at a supposed true proportion. Gradually the varying quantities became fixed, perhaps by taking the mean or average; and this early comparative method in time gave rise to a system of **Human Proportion.** It came to be believed that one part of the body was a standard, or key, or indicator for all other parts, such indicator being most frequently (but not always) the head as the chief part.

To Egypt it is that we are mostly indebted for our earliest knowledge of archaic science and art. Egyptian art was rigid and deficient in feeling, but considerable attention was given to Proportion, both as to height and breadth. Nor were those busy workers of the Nile valley without some rule or canon to guide them. There are three canons of Proportion known to have been used at varying periods: one belonging to the old empire—the most ancient Pharaonic monarchy; another to the Twelfth Dynasty, that period when Thebes was in the ascendant; and a third which underwent considerable modification, but afterwards remained unaltered until the times of the Romans. Among Egyptian relics have been found unfinished figures still containing dividing lines, presumably for the guidance of the artist, and sometimes similar lines have been detected under the coating of paint in completed samples. In the British Museum there is a tablet of the age of AMUNOPHTH III., B.C. 1250, where such divisional marks are clearly seen. On this two figures appear, one sitting and one standing; the latter is contained in nineteen spaces.

In the Sanscrit literature also there is evidence of the same drift of study. There is a model known to art students as the SILPI SASTRI. It is divided into 480 parts, the proportion given to the head being between seven and seven and a half heads. There was a model, also well known, which for some time was puzzling to antiquaries. It was divided into twenty-one and a quarter parts, no one knowing why; but more recently it was observed that the head-dress on the figure took up two and a quarter of these, leaving nineteen for the figure itself, thus corresponding to the Egyptian canon. This was the more interesting as the model in question did not belong to Egypt.

Returning now to the last of the three Egyptian canons, as mentioned above, it has been carefully compared with that of the Greeks as exhibited in their statues. It is believed that the great Polycletus, the rival of Phidias, who flourished about 440 B.C., produced his finest works by a *modulus*, which had been handed down from earlier times. Among those who entered into his labours was Marcus Vitruvius, the celebrated Roman architect, employed under Julius Cæsar and Augustus. He has left us among his valuable works the divisional system no doubt adopted generally in his time. This is known as the Canon of Vitruvius, and is believed to be that of Polycletus, the Father of Greek sculpture. The Greeks were the inheritors of the "Wisdom of the Egyptians," and handed it down to their successors, not only unimpaired, but enriched, modified and developed by the bearing of an intellect naturally acute and of a different order to that which found expression in the long Nile valley. Their successors were chiefly the master minds of Rome, and there is no doubt whatever but that Vitruvius transmitted the gradually acquired experience of a long past. The best edition of Vitruvius comes to us through an Italian artist, and Italy we know shared largely in the spoils of the shattered empire. The name of the transmitter was Leonardo da Vinci, and his book has been brought to the English student by Bonomi, in his "Proportions of the Human Figure as handed down to us by Vitruvius"—a translation of Leonardo's work. This and other text-books following on the same lines, are found in all the Academies and studios of Europe.*

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* For the following, and many more interesting facts, see Mr. Fletcher's essay entitled "Human Proportion in Art and Anthropometry." This little work will well repay the reader.

Thus are we brought into possession of the accredited Proportional Systems from the Ancient World. Begun by men who, primæval in age, were, nevertheless, true sons of science, inasmuch as they were simple *learners from Nature*—systems continued and enriched by succeeding generations, and adopted by masters of Hellenic, Roman, Mediæval, and Modern Art. There yet needed a connecting link to unite this long chain of highest skill with the meaner pursuit of the tailor; and as this link became forged, what was previously but a common industry, began its upward course as a science and an art.

That uniting coupler was found in the person of a certain German student named *Henry Wampen*. It is now many years ago since this youth, hailing from that maritime province of Prussia—Pomerania—arrived in Berlin to pursue his education. He entered on a collegiate course, and early took interest in art and Philosophy. Somewhat later a question arose in the College as to whether the Grecian ideal of beauty and proportion was merely speculative or founded on nature. The young undergraduate began reading up on the subject, and experimented by measuring the statuary. Experiment is the pathway to discovery. It was so with Wampen. The conclusion arrived at was that the classic artists had indeed founded their lofty ideal on "the solid ground of Nature." Subsequently an apparently trifling circumstance led the future mathematician into a line both novel and uncommon. He had been invited by his own tailor to enter the lists in a competition of a technical and sartorial character. He did so and won the prize. From that time his interests and efforts were diverted into this new channel. He continued his studies in the human frame and the art of draping, bringing to bear on his subject the accuracy of a geometrician and the enthusiasm of a true student. His interest in the despised tailor's art did not evaporate. He saw that cutting, though unrecognised by the learned world, was a difficult task, needing a more scientific basis and deserving a greater dignity.

Wampen became a teacher of cutting, and prepared three different works primarily for the guidance of his students—one on Preparatory Anatomy; one on Anthropometry; and a third on Models.† The books are too abstruse for the average tailor, but they contain a solid concrete foundation for the tailoring art, and they were undoubtedly the most important effort to apply the principles of science to that art hitherto made. In spite of their expense and depth their teaching gradually percolated downwards and coloured the whole of our future trade literature, and is doing so at the present day.

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* Those of our readers who are of studious mind and would like to trace more fully the labours of those who have worked at this science of Proportion, will find a deal of reliable information in a most valuable book, published under authority, entitled "The Sculptor and Art Student's Guide to the Proportions of the Human Figure." He will there find a long list of artists' names, belonging to different European countries, and ranging from classic to modern times. We shall have occasion to refer to this book further, and shall do so under the abbreviated title—"Art Student's Guide."

† It is sometimes thought amongst tailors that Dr. Wampen was the first to employ the term "Anthropometry," but this is incorrect. An artist named Bergmueller, also a German, published in 1723 a work which he called "Anthropometria."

OUR PROPER INHERITANCE.

The custom of ancient nations of representing their highest aspirations and ideal of Deity in human personified forms which appealed to the eye, amongst other things, gave their artists an immense incentive to their labours. There was a Providential wisdom in it all, as well as a substratum of positive truth. The Pantheon, as associated with their most sacred, deepest instincts, drew out all their resources and demanded their best skill, so that in the mythological statuary we get the highest attainments *petrified*. In chiselling out the "Angel" from the lifeless stone, the religious men of ancient time have revealed to us the *Ultima Thule* of their efforts. But where did they find their model? Well, from a source which was essentially one, but which appeared twofold. First, there was the source of Inspiration—the vision of the Ecstatic, who beheld the "gods" in human likeness; and second, there were the actual living models around them. In all their work Nature was their model; their highest art was to copy that which was real. As centuries rolled on from the cloisters, temples, and *Agoræ* of Egypt, India, and Greece, the ideals of proportion and form passed to the Studios, Forums, and Basilicas of Italy; and after the breaking up of the Empire, it was continued by the artists of Florence, Venice, Constantinople, and other European art cities, until the modern nations of our own time became the possessors of it.

We are not, therefore, to think of Anthropometry as some new thing—some individual dream of a sectary in art, having no practical value, but rather as our proper inheritance, laboriously gained by centuries of toil, to be added to by increased experience, and used in our own ordinary practice of tailoring.

FORM–KNOWLEDGE A TRUE FOUNDATION.

It has been long felt by the most practical and thoughtful men in the Tailoring trade that a recognised standard was greatly needed amongst us—a basis on which we could all agree to build. Now where can such a basis be found except in the old historic natural one of man-measurement which we have thus briefly tried to trace from earliest times down to the present hour? All wise men seek to build on old foundations which have been tested and have stood the test. The highest wisdom unites the past with the present, linking old with new by the strong and ever-stronger line of continuity. It has already been shown (and we hope to bring it home clearer as we proceed) that man-measurement is *old* and therefore rich in experience: it is *natural* and therefore true. It only remains for us to prove that it is practical and adaptable to present requirements. If so *it is the only foundation on which we can all agree to build.* Form-knowlege must be our substratum and our bond of union. It therefore seemed necessary to show that anthropometry was no private theory, no original system—that it was not invented by Wampen, nor is it the fanciful dream of the present or any particular writer.

SECTION V.

CANONS OF PROPORTIONS.

Reference has already been made to some of the canons or rules of proportion used by the ancient masters. One belonging to India which divides the figure into 480 parts, another having its origin in Egypt with its nineteen sectional marks. These, however, were not the only systems known and adopted. All such systems seem to have had a simple beginning, probably a series of marks for the guidance of workmen, then by degrees various parts of the body becoming standards of measurement as we have already seen. The head, as being demonstrably the most important of such divisions, became that canon or scale, but the proportion it was held to bear to the total height was by no means the same. It is said that some statues were made according to twelve heads, others to ten, others to seven or seven and a half. By degrees, however, greater uniformity prevailed and the

EIGHT-HEAD DIVISIONAL SYSTEM

took preference of all others. How far this method is true to nature, and to what extent it may be reduced to practical use, will be carefully considered as we proceed. It is more than probable that considerations other than anthropometric had something to do with its adoption.

WHY WAS THE HUMAN FIGURE DIVIDED INTO EIGHT HEADS? *

The full answer to this question would lead us too far astray for a work such as this, which is to be mainly technical and practical, but it will doubtless be found in the region of esoterics. In so dividing it the old scientists were applying a familiar current idea—familiar that is to the initiated few. They were working out a principle which to them was of the highest and most sacred character. The seven parts of the "Human Form Divine" were to them constituents of a complete oneness, and the head as the eighth was the octave—the perfected embodiment or *heading up* of the whole. Men of old time knew little or nothing of the dull prosaic materialism which permeates so much of our present work and thought. To them there was no cruel divorce between religion and science, now unhappily degrading our modern life. Thus the Eight-Head Divisional or Octaval System was at once sacred yet natural.

Coming to later times, the Octaval System has been repeatedly subjected to critical and independent examination by practitioners in art. The result has been that as a general basis, with a foundation in actual life, it has been confirmed, while as to detail it is open to variation.

Cardanus, an Italian, in his work on proportion, divided his model into a head and seven and a half times that amount.

Marting, also an Italian, has left a plate of human proportion on the basis of eight heads. Hoogsbraeten published a book in which two figures were shown, one of fifteen palms and one of sixteen, that is eight heads. Also two children's figures, one measuring four times the length of head, the other five times.†

John Priesler, a German born in 1698, gives a figure of a child whose length is four times the head; and also a female eight heads high. And more recently we have had further examinations into the Eight-head System by Professor John Marshall in his works for art students;‡ Mons. Rochet, whose system of proportion has had considerable influence in the French school; Jean Cousin who, while closely following the ancient masters, found his experience suggest several changes; Jacob de Wit, who follows a modified Eight-head System; Fau in his *Anatomie Artistique elementaire Corps Humain*, &c. Other writers have developed clever geometric schemes of proportion or investigated the law of growth, on the natural principles of beauty—such as Herr F. P. Leharzik Gibson, the sculptor, and D. R. Hay, Esq.

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* In his original MS. the present writer endeavoured fully to answer this interesting question, but as it seemed irrelevant and unnecessary for a practical work he has expunged that portion of his copy.

† "Art Student's Guide."

‡ "Anatomy for Artists;" "A Rule of Proportion;" &c.

It will be seen from the above that very much thought has been given to the difficult subject, both of the peculiarity and increase of form. It is impossible to follow, be it ever so lightly, in the footsteps of these cultivated men without distinct advantage accruing to each inquirer. Before, however, we can intelligently learn the lessons of proportion and growth it is necessary to know something of elementary anatomy, so far as this bears upon the subject of form. This will accordingly be the matter for our next section.

SECTION VI.

ANATOMY IN RELATION TO FORM.

THE SKELETON OR BONY SYSTEM.

In general build the human body is obviously divided into three parts—head, trunk, and limbs. Of these the first is the most complex, and in some respects the most important. It includes the face and a strong bony box called the cranium which encloses the brain.

The trunk is divided into two parts: the upper portion is the thorax or chest, the lower is the abdomen or belly. These two forming separate cavities are divided by a fleshy partition called the diaphragm, and are enclosed in a bony framework.

The limbs are arranged in two pairs, the arms or upper extremities, the legs or lower extremities. The whole body is made up of a very large number of parts having special functions or duties. These parts are called organs. The organic structure is arranged for convenience into groups or systems, and so wonderful is the entire economy that these various systems may be enumerated to a considerable number, eleven or more, according to the character of our investigation. It is highly probable (as mentioned before in Section II.) that **Form** is the complex result of all the varying conditions under which each individual is brought, acting, so to speak, on different natures, like rays of light falling at different incidence and on dissimiliar substances. Divisions of the systems are merely human arrangements for convenience sake, consequently they may all have their formative influence on the external figure, but there are two which affect and determine it in a more direct way. Of these we shall have to take more notice. The first of them is—

THE OSSEOUS OR BONY SYSTEM.

This consists of a large number of bones together forming the skeleton—the frame or hard portion upon which the soft parts of the figure are moulded. The bones are connected in such a way as to form joints or articulations and are bound strongly together by fibrous bands called ligaments. If we look at a human skeleton we shall notice that the **back-bone** is the supporting part of the whole frame-work. It is the central column of the edifice, the other bones being directly or indirectly united to it. But though a supporting pillar it is at the same time flexible, made up of twenty-four **vertebræ** or turning bones piled one upon another. In front these vertebræ are solid, giving strength to the frame; rearward they are hollowed, and when in position form a channel called the spinal canal. They are bound firmly together by ligaments, and are further connected with the cartilagenous or gristle plates which act as buffers to soften the force of concussion. Consequently the back-bone has much power of bending. Sometimes from special causes it bends too much and there is a "curvature of the spine;" at such, and at all times, the outward contour follows the internal column. Part of the vertebral series belongs to the neck, part to the back, and others to the loins, and according to these locations are termed **cervical,** five in number (from Latin, *cervix*, the neck); **dorsal,** twelve (from Latin, *dorsum*, the back); **lumbar,** seven (from Latin, *lumbus*, the loin).

Another prominent feature of the skeleton is formed by the **ribs.** They are joined to the dorsal portion of the vetebræ, curve round the chest, and, for the most part, connect with the breast-bone in front. All these together form a kind of cage of bone and cartilage enclosing the cavity of the chest, so that the posterior boundary of this cage are the dorsal vetebræ, the anterior is the breast-bone, while the curving costæ, or ribs, serve for side walls. In shape this thoracial cage is conical, tapering smaller to the top, and is an elastic framework with movable sides. Of the twelve dorsal ribs the seven upper ones articulate in front with the sternum (breast-bone) directly, the middle three indirectly, while the lower two, the free ribs, float unattached among the muscles. This freedom of the lower ribs gives us the reason why the waist can be so much suppressed.

At the upper part of the conical cage is another osseous arrangement sometimes called

THE SHOULDER GIRDLE,

and is made up as follows:—At the back are the large triangular flat bones called scapulæ or bladebones (from Anglo-Sax., *bloed;* Ger., *platt*, flat). The normal position of these should be noticed. They rest on the hinder part of the ribs, going to the side and extend from the first to the seventh ribs. They are held in position by muscles only, there being no bony attachments, except very indirectly, hence are capable of much freedom of movement. Their triangular shape should also be well remembered. The base of this triangle forms one entire side, and lies along the dorsal vertebræ. Along its upper part runs a ridge or spine ending in a projection called the *Acromion* (*Acro* = a crown, or top), which is above (overhangs) the glenoid cavity. The front portion of the shoulder girdle is formed by the collar-bone (clavicle). This stretches across the upper part of chest, one end articulating with the top of the sternum, the other forming a joint with the scapula near where this latter is united with the upper-arm-bone. This collar-bone strengthens the shoulders and keeps them back. It is an essential part of the skeleton, not only of man, but of animals which most closely resemble him.

Below the acromion and at the upper and inner part of the scapula there is a shallow cup-like surface called the *glenoid cavity*, and into it the smooth rounded head of upper arm bone fits in ball and socket form. It should be remembered that the bladebones are attached to other bones only in region of shoulder joint, their position otherwise being maintained by muscles, hence much freedom of motion is allowed the arm, as familiarly exhibited in "shrugging" the shoulders, &c. This series of bones, clavicle and scapula, uniting with the humerus (upper-arm-bone) taken collectively as forming the shoulder girdle are important to our subject, because they specially influence external varieties of form in shoulder region; but of this more hereafter.

Following the spinal column to its lower end, *i.e.*, to the lowest lumbar vertebra, we find it rests on the broad surface of a kind of curved wedge called the **sacrum,** attached to which is the **coccyx,** or cuckoo-bone. The sides of the sacrum unite with a pair of strong bones, which in form resemble a kind of basin. These make up the walls of the pelvis (Lat., a basin), the second important cavity of the human skeleton. They are called **ossa innominata,** and are the hip-bones. It is their upper projection that we feel when seeking for " hip " and natural waist.

A word as to the extremities or limbs. The upper and lower extremities closely resemble each other in their general arrangement of bones. The upper-arm corresponds with the thigh, both consisting of one large bone; in the arm, called the **humerus,** reaching from shoulder head to elbow; in the leg, called the **femur** or thigh-bone, the largest and strongest in the body. Again, the fore-arm answers to the lower part of leg, each consisting of two bones arranged side by side. In the former we have the **radius** and **ulna,** in the latter the **tibia** and **fibula.** A careful reference to an actual skeleton, or some good drawing, will show that in measuring the arm the part of elbow felt for by the tailor is the upper extremity of the ulna, which bone sends a projection behind the humerus called the **olecranon** process (from Gr., olene, elbow; and kranion, top). At the knee joints there is a third bone, which serves as a protector, called the knee-cap or **patella** (Lat., a little plate).

The osseous arrangement of the wrist and hand also closely resemble the ankle and foot. For instance, the metatarsal bones in the instep are similar to the metacarpal bones in the hand, and the number of bones in the toes agrees with the number in the fingers and thumb. The prominence in the wrist felt when measuring length of sleeve is one of the carpal bones.

Our book being intended chiefly for tailors, it is not necessary to dwell upon the cranium and face. Furthermore it does not fall within our plan to extend this very brief outline of anatomy further than to summarise as below. In these days the very best information in human physiology is easily obtainable to all who seek. There are numbers of books which treat exhaustively of the subject, and to them the student of form is referred.

SUMMARY.

The Body is divided into three parts—Head, Trunk, and Limbs.
The Trunk is divided into two parts—Chest and Abdomen.
The Limbs are arranged in pairs.
The Body has a large number of parts or organs having special functions.
The Organic Structure is grouped into Systems, of which the Bony and Muscular more closely affect Form.
In the Skeleton the chief divisions are—The Back-bone, Ribs, Shoulder girdle, and Pelvis.
The Extremities, upper and lower, resemble each other in bony arrangement.

SECTION VII.

ANATOMY IN RELATION TO FORM.

THE MUSCULAR SYSTEM.

Besides the bony framework, the muscles or flesh of the body have very largely to do with Form. The exact process of their growth is subtle and wonderful; we may hope to do no more than approach it. A muscle is composed of a number of fibres, arranged side by side, and fastened together by a membrane or skin. Voluntary muscles, that is, those whose working is under the control of the will, are in nearly every case connected with bones. At one end we may find such a muscle secured by a tendon to a fixed bone, at the other to the bone about to be moved. The several fibres at the command of the will have a power of contraction, of shortening or thickening in the middle; this action causes the bone to move and the limb to bend. When it has to be straightened or brought back to its former position, another set of muscles are brought into play. In the first instance it is the **flexors** which are at work, in the second the **extensors.** Muscles, therefore, are the **pulleys** of the body. They exhibit in their action a complete system of leverage, and the principles of mechanics are seen to perfection. This complex movement of leverage and pulley is continuously in operation. Everytime we stand, or walk or run, or move any part of our body, the required ropes are busy contracting in all directions. Even while at rest or quiescent in sleep, the activities, though lessened, are still maintained. The principle of "use legs and have legs" is prominently brought out in muscular action. A continual waste of the body takes place—a loss of tissue at every movement, but during life the flow of vitality seems attractive to those very parts where the drainage is; and further than this, the greater activity the muscles undergo, the more their tissue and tenure is increased. This peculiarity has the effect of largely determining external form. Continuous use of one set of muscles leaves its mark in a special development of their strength and bulk. Labourers, mechanics, and hard workers grow big about the back, arms, and shoulders, and relatively small in chest, because the deltoides, the levator scapulæ, the latissimus dorsi, and trapezius muscles have much to do, while the pectoral and shoulder joint deltoides are comparatively quiet.

The general form of a muscle is thickness in its middle or body part and tapering towards its points of origin and insertion. This special feature has its result not only in utility, but in much of the beauty of the figure. The graceful neck-column, the rounded shoulder, the developed biceps, the tapering wrists and finger ends, the expansive chest, the full luxuriant bust, the well-shaped leg and the dainty feet, all of them recognised points of beauty, are the outcome of muscle arrangement. It might have been otherwise. Muscles might have been cylindrical, having no tapering ends or rounded centres, or their overlappings or locations might have been utilitarian only. Suppose for instance the central muscle of upper-arm—the biceps—had been uniformly cylindrical, we may suppose the flexion would have taken place as now, but what a sacrifice of beauty of contour! Nature, however, has a dual purpose and combines both principles.

Another fact concerning the muscles which should be noticed by the student of Form is their place in the body, and their special manner of overlapping or minglement. Attention to such matters is sometimes of much practical use. For instance, observe the direction of those muscles which go to form the back arm-hole and shoulder. So closely dovetailed are they that it is impossible externally to fix upon any point where one muscle ends and another begins. Consequently the same muscle in one of its parts may be comprised in width (as for instance, in the circumference of chest, or in the measurement to front of arm-hole), while in another of its parts it is a constituent of length (as for instance, from nape of neck to bottom of arm-hole). If so, we may expect some uniformity in the depth, or vertical diameter of arm, with that of its width or lateral diameter. And this is what we really find: so that in some parts of the body length and width are co-related and cannot be treated of as distinct quantities. Several well-known neck and shoulder muscles will illustrate this, as the *Pectoralis major,* the *Trapezius,* and especially the large *Deltoid.* The same co-relation of length and width in scye region is observed geometrically when we regard the arm-hole or scye as a figure circular or nearly so.

SUMMARY.

Muscles, like bones, are Form-builders. In shape they are thickened at the middle and taper towards their ends. They are the pulleys of the body, and by their shortening or contraction move the bones. This contracting process is constantly maintained during every action of life, which causes waste and loss. The drainage, however, attracts new supplies of vitality and matter, resulting in enlargement of the very parts most used. This wonderful fact and the rounded forms of muscles give beauty to the human form; so that utility and beauty are associated in nature. The principal muscles which affect external form follow in a subjoined list.

SOME PRINCIPAL MUSCLES.

The following are some of the principal muscles with which every student of form should become familiar. They are set forth in the simplest possible manner.

Trapezius.—This forms the extreme border of the neck, reaching to shoulder, and spreading to cervical and some of the dorsal vertebræ. It elevates shoulder and partly rotates shoulder-blade.

Levator Anguli Scapula (blade-bone lifter).—At back of neck. It raises the superior angle of scapula.

Mastoideus.—A superficial muscle but chiefly covered by the thin and broad Platysma Myoides.

Platysma Myoides.—A large cutaneous mass of muscle nearly covering whole side of neck.

Splenius Capitis.—This with the Sterno-Mastoid are used in turning and moving the head backwards.

Latissimus Colli.—A name given sometimes to the broadest muscle of the neck.

Trapezius.—A large muscle, sometimes called the Monk's Hood, in the back (see above).

Deltoid.—This is the important shoulder-cap muscle which passes from collar-bone and scapula to the humerus and, covering the deep-seated tissues, gives form to the shoulder. It raises the arm from the side.

Rhomboidei Minor and Major.—These are deeply covered and work the blade-bones, &c.

Latissimus Dorsi.—Important surface muscles reaching at back of figure from the shoulders to the Pelvic girdles, used for drawing arm downwards, backwards, and rotatively.

Pectoral.—A group of muscles in the chest reaching from shoulder girdle to front of thorax and clavicle. They are distinguished as major and minor, and are used for drawing the arm across chest and in depressing shoulder head.

Sacro-Lumbar.—These are the fleshy masses of the back below the great Dorsal muscles.

Great Oblique and Serratus Magnus are situated at the side of the figure.

Gluteus Maximus and Gluteus Medius.—The large muscular masses of the seat, for moving the thigh in various ways.

In the arm are many muscles, the one most familiar, because more easily observed in action, is the *Biceps* in the fore-arm. Lower down we have the *Extensors* and *Flexors* and great and small *Palmar* muscles with all the intricate muscular machinery for working the hand and fingers.

In the leg the *Gluteus Medius* reaches from the Iliac bone to the knee. In the thigh we have the *Sartorius* (or tailor's muscle), the *Triceps* and *Biceps.* The fleshy projection on inner side of leg just above the knee-bones is a portion of the Triceps, while the rounded calf is due to the bellied portion of the *Tendon of Achilles.*

Should the reader desire to go more fully and scientifically into the subject of the Anatomy of the Muscles he is recommended to consult Professor Marshall's "Anatomy for Artists," and Dr. Fau's "Anatomy of the External Forms of Man," Notes to "Allman's Anatomical Diagrams," &c.

PART II.

PROPORTIONAL AND SECTIONAL GROWTH.

SECTION VIII.

FORM-GROWTH IN BOYS AND GIRLS.

Mention has been made of certain canons of proportion, especially that of the historic eight-head system; before, however, enlarging on this latter and showing of what practical use it is, it will be advisable to briefly treat of those **juvenile forms** to which ordinary canons are not strictly applicable. Not that growth, during the early periods of human existence, is without the control of law, for we shall find that there are rules amid all the diversity of young life; but it should be remembered that the **octaval** canon properly belongs to manhood and womanhood, and that its substitution by another arises from the fact that the figure is as yet in its undeveloped stage. Careful investigation has further revealed that during this transition period (if one may so express it) nature is ever struggling towards a perfect proportion.

As a rule, those for whom this book is intended have to deal with the figure not much earlier than its five-year-old stage. But in order to give greater completeness to our work, we may perhaps devote a few lines to form-growth at its infantile period.

In doing this we shall follow chiefly the *Art Student's Guide,* as this book bears the weight of authority and comes from very experienced writers.

FORM-GROWTH FROM BIRTH TO FIVE YEARS OF AGE.*

At birth the child is 18 in. long. Its head is one-fourth of its total height. Respecting the sexes, there is a difference of height and weight between male and female greatly to the advantage of the former. There are some curious gradations in the arm, for instance—length of hand 2 in.; to elbow 3 in.; upper arm 4 in. Length of lower limb is 5 in.; base of neck to navel 6 in. Notice that the total height is one-fourth of a tall fully-grown 6 ft. adult. The head is very large—about twice the adult proportion, it is therefore clearly subject to only half the amount of enlargement which takes place in other portions, or in other words, the limbs, &c., must grow much quicker than the head.

At four months the struggle for proportion has begun. Height 24 in. (a very rapid growth); the head nearly a quarter; the navel is at half height; extended arms equal height; nipples 2½ to 3½ in. apart.

Notice here that the growth in height (an average of 1½ in. per month) has chiefly taken place not in the head, for this has already began to lose its lion's share, not in the trunk, but in the upper part of legs.

This six inches of added stature is frequently exceeded, in boys especially. Notice also that the navel is at half total height, giving colour to the old idea that this point was the true **centre** of the **body.** The extended arms equal the height, a proportion fairly maintained throughout the whole career. The mention of the position of nipples is not unimportant, as will be understood by those who follow the course.

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* The quantities which follow are based on averages, the living models themselves having been measured

Eight months and onwards—

Height, 26 in. Navel, little above middle. Ulna* and foot are equal.

The rate of increase is less, but still considerable, being two inches in four or five months, and the position of navel shows that it is the legs that have outdistanced the trunk. The length correspondence of ulna and foot is both interesting and useful; moreover it is a proportion (speaking generally) of permanence.

Twelve months—

Height, 28 in. Head, 6 in.
Middle of figure touches testicles.
Ulna, foot, and nipple space are equal, 4 in. each.

The child has now completed his **first year.** As at birth, his form may be divided equally into four parts, but this time of seven inches each. The division will reach as follows:—Crown of head to pit of neck, 7 in.; thence to navel 7 in.; thence to knee 7 in.; thence to foot. During this period the head has grown 1½ in.; trunk and legs, 8½ in.; and arms have kept fair pace with the latter. The ribs have also extended beyond their normal boundary,

The second year of growth gives us the following results:—In the first six months we get two inches added to total height; the ratio of increase is therefore lessening. Of this two inches, one quarter of an inch goes to the head, navel little above middle, while the ulna and foot are still "neck and neck." The succeeding half-year adds an additional two inches, making thirty-two in all; but there is now an outward expansion in shoulders and ribs. The head grows slowly, being only 6⅜ in. long.

Two years and a half—

Height 34 in. Outstretched arms equal height.

Thirty months have sufficed to give our baby model half his full or manhood stature, and though the region of shoulders, chest, and stomach are continually augmenting, yet generally at this period nature seems busy with altitudinal growth: and this, as the above item of equal extension will show, in the upper as well as the lower limbs. The head in approaching its normal proportion has only added about another one-eighth of an inch to its length, and now claims a little over a fifth of entire height.

Three years—

Height, 36 in. Head, 6½ in.

There is nothing of special character to notice here.

Four years—

Height, 39 in. Head, 6¾ in.

Here we see a normal growth in one year of three inches, while the head itself gains one-quarter of an inch. The chief proportion of development is still seen in the lower limbs. If the figure were equally divided the centre line would still fall *above* the upper part of the pubis, whereas it should be identical with the pubical line.

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* The ulna-length of arm is of course from the elbow to the wrist. This dimension runs a close race with the length of foot, as many a homely mother knows very well when she measures the size of sock or stocking by taking the child's ulna-length.

During the next few months (say next half year) another one and a half is added, and the head becomes one-sixth of height.

FORM-GROWTH FROM FIVE YEARS TO FIFTEEN YEARS.

We now approach the time when our imaginary little friend may be introduced to the clothier. We scarcely venture to say "tailor," for a host of circumstances, which need not be mentioned here, have almost prevented the working tailor from even entering the lists for the production of boys' clothing. The measurements of boys of different ages that follow are not those taken by tailors, but are obtained by medical men and artists from the nude, probably by means of compasses.* Some of them need a word of explanation, especially as they are now to be reduced to practical use. For instance there is the

Nipple Space.

In a properly developed figure this dimension taken on the curved surface as a tailor or dressmaker would take it (*i.e.*, on the draped form), averages nearly or about a quarter of the chest circumference. This is in accordance with the octaval system as applied to widths, which is explained further on. But a comparison of such dimensions in the instances below will reveal the fact that the proper proportion is not generally attained in boys and girls, because the chest is not developed or expanded as in after life. It therefore appears less than a quarter, this diminution will appear more conspicuous owing to the difference of the figure as draped or nude.

Width of Shoulders.

This should be considered as a direct horizontal measure from the outer boundaries of the shoulders or arms, and not from acromion to acromion.†

Arm Lengths.

It will be noticed that we get specified three natural divisions of the arm. To interpret them into an ordinary length of sleeve we should have to proceed as follows :—add half nipple space, upper arm, and ulna together. To the aggregate of these about 3½ in.‡ must be further added for angle of arm, as required for tailors' measurements.

FIVE YEARS—

Height, 3 ft. 6 in. Head, 6¾ in. (giving a proportion to entire height of a little more than one-seventh).
Breast, 23 in. Waist, 23½ in.
Width across shoulders, 9 in. Ground to top of knee, 12 in.

Length of hand,	4¼ in.	= 21, which multiplied by 2, = height.
,, ,, ulna,	6 in.	
,, ,, upper arm,	8½ in.	
Half nipple space,	2¼ in.	

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* An exception may be made in the size of chest and waist; these may be taken as tailors' measures as ordinarily taken.

† See note on Framing.

‡ The ordinary allowance for men is 4 in. for angle of arm.

Six years—

Height, 3 ft. 8 in. (An increase of two inches in one year.)
Chest, 23½ in. Waist, 23¾ in.
Nipples apart, 5½ in.
Width of shoulders, 11 in. = ¼ of height.
Upper arm, 8½ in.
Ulna length, 6½ in. } = 44½ in. for extended arms, a little more than height, including nipple space.
Hand, 4½ in.
Ground to top of knee, 12¼ in.
Centre little above pubis. Head nearly, 7½ in.

Seven years to ten years—

Height 3 ft. 9 in. (An increase of one inch in one year.)
Chest, 23¾ in. Waist, 24 in.
Head, 7½ in.
Nipple space, 5½ in. Width of shoulders, 11 in.
Upper arm, 9 in.
Ulna, 6½ in. } = 45¼. (See above under *six years*).
Hand, 4⅝ in.

In this and the succeeding three years there is a **comparative slowness of growth,** an average of one inch or thereabouts in each year, although many boys under favourable conditions exceed this. There is, however, scarcely any growth in the height of head, but the skull expands slowly in both its diameters as also the face in length. There is a slight and gradual enlargement of shoulders. The vertebra and trunk elongate in fair proportion to the entire height. The major growth, however, is of necessity in the legs, which we saw at birth were very short, and therefore are apportioned a more rapid ratio. The Ulna and foot keep surprisingly well together, and the arm corresponds with the leg. There is another point. As the humerus (upper-arm-bone) agrees in its anatomy with the femur (upper-leg-bone) so also does it compare with it at least to some extent in its relative growth. At this stage both legs and arms are disproportionately long, but only slightly so.

These details will be found of value when we come to reduce them to practical use in our Rules and Tables.

Eleven years—

Height, 4 ft. 2 in. (An increase of two inches in one year.)
Breast, 28 in. Waist 27 in. Head, 7½ in.
Width of shoulders, 12½ in. Nipple space 5½ in.
Upper-arm, 10½
Ulna (also foot), 7½ } =52 in., 2 in. more than height, reckoned as explained above.
Hand, 5¼

At this period lads generally begin to grow faster. It is stated to be a Law of Nature that from the ages of 7 or 8 to 10 or 11 the rate of growth is about one inch per annum, but after this time follows an era of much more **rapid development,** namely, of three inches each year. Some grow much more in the same period. If so they attain to manhood's standard quicker and stop earlier, or, they are destined to a stature exceeding the average.

TWELVE YEARS—

Height, 4 ft. 5 in. Increase of three inches in one year.
Breast, 28½ in. Across shoulders, 13½ in.
Across nipples, 5¼ in.
Upper arm, 10½ in.
Lower arm, 8½ in. } = 54¼ in. including nipple space, exceeds height by 1¼ in.
Hand, 5½ in.

THIRTEEN YEARS—

Height, 4 ft. 8 in. Increase of three inches in one year.
Breast, 29 in. Head, 8¼ in., almost a mature length.
Across shoulders, 13 in. Across nipples, 6½ in.
Upper arm, 12 in.
Lower arm, 8½ in. } = 59¼ in. including nipple space, exceeds height.
Hand, 5¾ in.

As we approach the standard size in human models it is very noticeable how the various Art teachers by independent ways of investigation confirm the system of proportion, which we shall presently make clear. For instance, in this present model by measurement, taken most carefully from life, we find three equal divisions, reckoning from the chin to the centre of figure just above pelvis. They embrace 6½ in. each measured vertically, and fall in the natural and tailor's divisions, namely, from nape to bottom of scye, from bottom of scye to natural waist, from natural waist to the seat line. Now according to the proper proportion of a full-grown figure, their quantities should be seven inches respectively, and their deficiency shows that a lad at this age owes his height mainly to his legs, which have for the time being out-run his upper parts. If a comparison be struck say from forms of 11 to 13 years it will reveal further this process of average growth. In the interval the three sections under review have been handicapped to the extent of a quarter to half an inch.

FOURTEEN YEARS—

Height, 4 ft. 11 in. Increase in one year, 3 in.
Breast, 30 in. Waist, 29 in. Head, 8¼ in. No increase.
Across nipples, 7 in. Across shoulder, 14 in.
Upper arm, 12 in.
Ulna (also foot), 9 in. } = 61 in., about two inches in excess of height.
Hand, 6 in.
Centre of figure at pubis.

This last item should be noted, as it shows that Nature is gradually **approaching an ideal** or proportionate form, and meanwhile this is done in another important feature. The waist, which in childhood often exceeds the chest in circumference, becomes in its turn the lesser quantity. Shape and beauty are by degrees revealed. We find the same tendency in respect to the length of arm, which has exceeded the height to within half an inch of its proportionate quantity; henceforth, speaking generally, these lengths are "law-abiding." They are reduced to practice in the Tables of Measurements.

FIFTEEN YEARS—

Height, 5 ft. 2 in. to 5 ft. 4 in. Breast, 32 in. Waist, 30½ in.
Head, 8½ in. Across shoulders, 16 in. Nipples, 7½ in.
Centre of figure at pubis, 32 in. Upper arm, 13 in.
Ulna, 10 in. Hand, 6¾ in.

No useful averages can be struck after this period. The medium height of 5 ft. 6 in. is quickly reached, and the varieties in final development or maturity of size are so great that it would be unnecessary for our purpose to follow this special inquiry. Not only the body but the whole being changes at **puberty.** As it has been strangely observed, at this remarkable epoch the youth, whether male or female, becomes for the first time vividly conscious of a diversity of sex, and with this growing sense of duality there comes upon him or her a restlessness to turn this very duality into a realized unity again. At such a period, also, the young man's interest in his tailor, or that of the maiden in her costumer, really begins in earnest.

FORM-GROWTH IN GIRLS OF CORRESPONDING PERIOD.

The distinction or bifurcation of the sexes as regards their general form is of gradual operation. At birth boys are generally bigger and heavier than girls, but sometimes the difference is not of great extent. After the age of **five years** some idea of their relative growth may be obtained by comparing their average weights, and here some facts are revealed not generally known. Beginning at five years of age the weight of boys gives an average of 3 st. 8 lbs.; that of girls 2 st. 12 lbs., an excess for the former of 10 lbs. The **next year** shows a similar proportion, but thenceforward up to the age of **ten** a gradual diminution of difference takes place until the girl is only 7 lbs. behind. During this same period the boy has added annually to his weight at a rate of 3⅖ lbs., while the girl has done so at a rate of 4⅖ lbs.

The next period, from **ten** to **fifteen,** the same tendency is shown. The boy takes on per year an average 6⅗ lbs.; the girl 8⅘ lbs. Beginning, therefore, at five years old 10 lbs. behind she finishes at **fifteen** 3 lbs. ahead, the dead-heat year being the twelfth.

Respecting **height** at these earlier stages there is no great distinction to observe. Of recent years the stature of girls has undoubtedly increased, and it would seem that the "New Woman" will soon be a physical and *statuarial* fact. Girls are supposed to be somewhat shorter than boys, but to be up to date it will be fairly correct to regard them as of similar height.

Presumably the reason for the increased ratio in female growth as explained above is twofold: first, because girls begin the race handicapped, as it were, that is at a less size and accordingly have a greater headway to make; secondly, because after the pubescent stage the forces which make for growth take another direction than that of adding to stature; their way, henceforth, is towards development of those parts of the human economy which belong to full womanhood and give to it that beauty which all alike admire. The difference of the female in standing height in adult life compared with the male, arises therefore chiefly from an earlier stoppage of altitudinal growth.

Dr. Bowditch, estimating from 10,904 public school girl pupils, showed that none of these increased in stature after reaching the age of eighteen years. On the other hand, Dr. Roberts has compiled a table showing the result of his observation on 14,000 males of the British artizan class, which proves that in 90 per cent. of all the cases, increase in height continued till the age of 22 was reached.

SUMMARY.

At birth, according to medical and artistical science, the average height of the child is eighteen inches, the head being then about one-fourth of this quantity. Consequently this part is disproportionately large. At first there is a very rapid growth, which, with minor variations, is kept up for the first seven-year stage. During this time the body attains to considerably more than double its original or birth size. To this period follows a semi-septennial course of slower growth, averaging an additional inch a year. The legs and arms increase more quickly than the trunk. The head has a comparatively tardy enlargement. From twelve years and upwards another series of quick developments take place. From five years and upwards girls increase in weight at a quicker pace than boys.

FIG. I.—Illustrating the stature growth of boys from birth to fifteen years of age. The length of the lines shows the average height; the space between the top and the letter H gives the proportion of head.

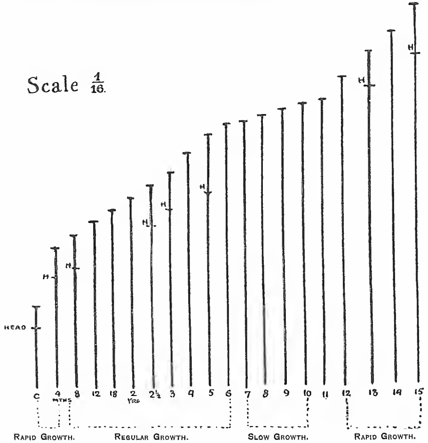

FIG. I.

SECTION IX.

THE OCTAVAL OR EIGHTH DIVISIONAL SYSTEM.

MAPPING.

In the study of form, whether of the human model or of any other body, one plan suggests itself—a plan that has been tested by experience and is at the same time simple. It is that of **mapping out** or sectionizing the surface or space which may be the object of investigation. The astronomer thus maps out the starry vault above him, dividing it up by imaginary lines or degrees; the geographer does the same with the earth's surface; the topographer in drawing his local maps follows a similar practice; and in common life, whether for business or for politics, or for distribution of charities, the organizer acts on this same principle in dealing with his district.

If in thus dividing the human figure we can at the same time follow nature's own boundaries, so much the better. What has already been said concerning the eight-head theory will have prepared the student for pursuing still further on similar lines.

The plan of division adopted in this work is the **octaval system.** This, as the word implies, sectionizes the human body into eight parts, both as to its length and width, making in its entirety sixty-four parts. If, however, the mention of so many divisions seems formidable to the student, we would ask him not to be nervous, as there is no intention of unduly burdening his memory. Deducting the head we at once reduce the number to fifty-six, which would leave twenty-eight for the front of the figure and twenty-eight for the back. But even here there need be no anxiety, for what is chiefly required is—not the precise location or distinctive naming of each part, but more particularly the position of its dividing lines. This latter may be easily learnt and retained in the mind, and certainly should be, at any rate by the rising generation of tailor-artists.

The advantage to be gained in thus mapping out the surface of the figure must be so obvious to every thoughtful mind that it scarcely needs justification, for by it one deepens his knowledge of his model, and is able to define and fix upon localities much more easily than without it, and in practical application he limits his errors by confining them to their proper, and necessarily smaller, sections. In passing, also, it may be well to meet objectors by at once stating that "mapping" is by no means original. All those who deal closely with the human form must follow the principle to some extent. For instance, medical practitioners have carefully traced certain divisional lines on the body, by means of which its superficial portions are localized and technically understood. Such divisions are called **abdominal** or **thoracic regions,** being enclosed by imaginary boundaries on the abdomen and thorax. Horizontals are drawn from side to side at the bottom of ribs, the chief processes of the ilium, base of the scapulæ, through the nipples and under armpits, from acromion to acromion, and so on. Two vertical lines are then traced on either side from the cartilage of the seventh rib to the spine of the ilium in front. By such means students obtain as many as nine regions in the abdomen and as many as ten in the thorax. Several of them, following as they do natural boundaries, would be readily recognised by the scientific tailor. For instance, the *humeral* would answer to his height of neck and upper shoulder section; the *sub-clavian* to his scye diameter; the *mammary* and *epigastric* together would embrace his under-arm depth, &c., &c. This precise way of mapping out is not required among tailors and costumers, as the sections they are called to deal with are not identical, but the idea is just as applicable to their profession as to that of the doctor—it need only differ in application; and the fact that such a plan works successfully for the anatomist and artist justifies us in taking so much of it as will be useful.

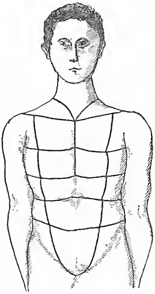

FIG. 2.

FIG. 2.—Illustrates this method of division as carried out by scientific men. Only the front of figure is given here, as it is merely intended to serve as an indication of what is being done in other professions. To each of the regions a special name is given, and considering that both back and side are similarly mapped out, it is evident that the medical student is trained to understand the surface of the human body in a more exact manner than the cutter. The latter's task is much easier, but the illustration will serve as an introductory idea of mapping to be explained in its present application further on.

FRAMING.

In addition to the above, artists have a useful method of drawing right lines in the form of a parallelogram which, touching certain extreme points of the human figure, enclose it in a **frame.** The real or imaginary presence of such lines enables the eye more readily to note any peculiar prominences, depressions, or curves, and the observer is gradually trained to compare the dimensions and proportions found in nature's varying specimens.

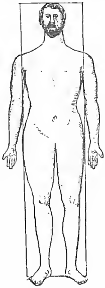

FIG. 3.

FIG. 3.—Shows the adult male model framed. It will be noticed that the vertical lines pass through the shoulder and touch the figure under the arms and at prominence of hip.

With the female figure, FIG. 4, such lines, while in the same manner touching the hips, are wider apart and extend almost to the outer part of shoulder or arm. A perfectly formed woman in her ordinary dress will stand as nearly as possible in such a frame. Her clothing round the hips will extend them to just about the outer shoulder line. It will be thus seen at once that the female formation in region of hip and chest is different from that of the male. The practice of observing the figure in connection with right angles and direct lines will be found greatly educative to the eye and a help to the memory.

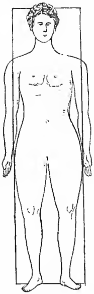

FIG. 4.

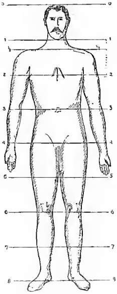

FIG. 5.

PROPORTIONS IN THE ADULT FIGURE.

The Octaval Division of Lengths.

FIG. 5.—Shows us the human figure divided into eight parts, each one being equal to its head. It must not be considered that the sectional lines have been fixed arbitrarily in order that the figure may be fitted to them. Experiments, both on samples of Art and also on actual living figures, have proved, over and over again, that this ancient method of division, though differing in detail and in minute quantities, is near enough for practical purposes for tailors and clothiers.

Taking the figure in its normal standing attitude, the foot resting level on the ground, we get the following divisions, and it is most important that the student of Form should familiarise himself with these localities, the more so as they are each one useful to the tailor :—

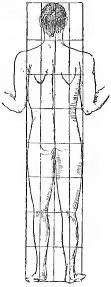

FIG. 6.

Front of Figure.—FIG. 5.

From top of head to chin	... = $\frac{1}{8}$	total height.
,, chin to nipple ...	... = $\frac{1}{8}$	,,
,, nipple to navel ...	... = $\frac{1}{8}$	,,
,, navel to os pubis	... = $\frac{1}{8}$	,,
,, os pubis to mid-thigh	... = $\frac{1}{8}$	,,
,, mid-thigh to below knee	= $\frac{1}{8}$	,,
,, below knee to below calf	= $\frac{1}{8}$	,,
,, below calf to sole of foot	= $\frac{1}{8}$	,,

Back of Figure.—FIG. 6.

From top of head to nape of neck	= $\frac{1}{8}$	tot. hgt.
,, nape to bottom of arm socket	= $\frac{1}{8}$	,,
,, bot. of arm socket to nat. waist	= $\frac{1}{8}$	,,
,, nat. waist to centre of buttocks	= $\frac{1}{8}$	,,
,, centre of buttocks to mid-thigh	= $\frac{1}{8}$	,,
,, mid-thigh to below knee (or small)	= $\frac{1}{8}$	,,
,, below knee (or small) to bot. of calf	= $\frac{1}{8}$	,,
,, bot. of calf to bot. of heel ...	= $\frac{1}{8}$	,,

We proceed to notice, therefore, in a more detailed manner where these sectional lines fall, with their corresponding positions as understood by tailors.

Position of Sectional Lines technically and practically set forth.—Lengths.

The Sectional lines are called—	*For Tailors they are—*
First, the **Collumial,** is from chin in front, passes over seventh vertebra or nape, and is the boundary between head and trunk.	The nape, the 'tailor's starting place,' from which measurements should be taken, and not from collar seam, unless it be rightly placed.
Second, the **Thoracial,** passes over the nipple (or breast proper) anteriorly, through the *fovea axillaris* point (*i.e.*, bottom of scye), and at back over lower part of scapula.	Bottom of scye line.
Third, the **Ilial,** crosses the navel just above the *Trochanter major* (hip-bone), thus determining the true waist.	Natural waist.

Fourth, the **Gluteal,** traverses the genitals at the *os pubic* point, where the large gluteal muscles are most bulky. It is in close proximity to point of union with lower limbs and trunk, being about one unit above actual fork.	True place for taking seat measure.
Fifth, the **Femoral,** passes through middle of thigh (femur bone) almost midway between fork and bottom of knee-cap.	Middle of thigh; it is useful in breeches cutting and tight leg garments, and is a guide for determining lengths of coats where measures are unobtainable. (See Rules.)
Sixth, the **Patellal,** falls at lower boundary of patella (knee-cap) and through tibial indentation.	Small, an important locality in breeches, knickerbockers, and other leg garments.
Seventh, the **Sural,** takes us to lower region of calf—the sural part of leg.	Base of calf, a guide for termination of pants, lengths of coats, &c.
Eighth, the **Pedal,** is at sole of foot, the nether boundary of figure.	In external measurement is the seam of boot—the length for trousers.

Of the above longitudinal parts the second one, from nape to bottom of scye, is sub-divided naturally into two, a sub-sectional line therefore is drawn, passing along the crown of scapula; hence it is called the **Acromial** line (Greek, Ακρο= crown). The lower portion of this eighth (that embraced by the acromial and thoracial lines) is clearly the vertical diameter of arm-hole or scye. The upper portion, from acromial to collumial lines, is what tailors call "height of neck," and is, considering its limited quantity, and for tailors, one of the most important in the whole body. Speaking roundly, we find that the divisional lines fall on stations well known to tailors: the nape of neck, bottom of scye, natural waist, and end of trunk or seat. This will appear the more practically important, as one of the most ordinary measures taken by tailors is from nape to natural waist, which comprises one-half of trunk length. Care has to be taken in obtaining this, as indeed with all measures, but we are greatly assisted in correcting or checking our practice by a knowledge of these natural sections. It is a recognised fact that the axial part of figure, that comprised between the first and fourth divisions—the back-bone region, *is much less subject to longitudinal change* than the lower limbs, consequently these axial divisions are more reliable as a basis in this very locality than in other parts of the figure. Differences in height are chiefly due to changes in the limbs, length of trunk not varying more than 2 or 2½ inches in all the ordinary specimens of men.

SECTION X.

FURTHER PROPORTIONS IN THE ADULT FIGURE.—LENGTHS.

[NOTE.—*This section being confirmatory only may be omitted if desired.*]

Under Section V. mention was made of two Rules of Proportion, that of M. Rochet and that of Professor Marshall.

Rochet follows the ancient Eight-Head System, except in one important particular. His experience, gained from extensive measurement, taught him that the ordinary octaval method, which assumes the figure to be standing in normal attitude with foot levelly placed on the ground, gave its proportional results too short, *i.e.*, the parts were generally in excess of the head. In other words, he found the head usually smaller than one-eighth. He therefore suggested that Nature's true proportion was to be reckoned with the forepart of foot extended downwards, or in plain language on *tip-toe*. This increased the height about two units, consequently every eighth was lengthened about one-fourth of a unit. The extended foot is of course an integral portion of the lower limb, just as the hand is of the upper limb. The utility of M. Rochet's conclusion for students of cutting is this—that it is a confirmation, not of exactitude in detail, but of a general truth that the ancient division follows Nature sufficiently close to be serviceable to them. The way to apply it is simply to add one-fourth of an inch (or one-fourth of a unit) to each eighth.

Professor Marshall advocates a rule of proportion, which contains valuable truth and is more elaborate.

As we are anxious to avoid everything of a confusing nature, and also to use all our facts in supporting our main argument, we shall forego all detail, and merely introduce it with this purpose in view.

He points out that the stature, or standing height of man, is composed of two dissimilar parts; it depends partly on the length of its axial portion (*i.e.*, head, neck, and trunk), and partly of that of the appendicular portion (*i.e.*, lower limb or leg).

A reference to Figure 7 will show that these two *overlap* at pelvis, so that neither enters into height in entirety; also forepart of foot must be excluded in measuring from sole to crown as explained above. Height is therefore a complex factor. The four height factors are:

1. Length of axial portion (head, neck, and trunk). (See dotted line.)
2. Position of and distance between the joining sockets of arm and leg. (See plain line.)
3. Length of segments of arm.
4. ,, ,, of leg. (See dot-and-dash line).

No. 1 is divided into four parts of 9 units each, making 36 in all.

Now, as this is the result of another independent inquiry, we may compare Marshall's divisions with those previously set forth, in order to confirm and familiarise us in the system.

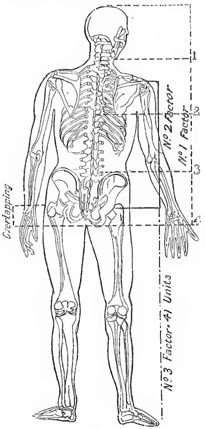

FIG. 7.

Professor Marshall's Body Sections compared with Eight-Head Body Sections.

(See Fig. 7.)

PROF. MARSHALL'S BODY SECTIONS.		EIGHT-HEAD BODY SECTIONS.	
From crown of head to chin	= head.	From top of head to chin	= head.
From chin to end of breastbone (little below nipple)	= scye depth.	From chin to nipple	= scye depth.
From thence to top of pelvis	= natural waist.	From nipple to navel	= natural waist.
From thence to lower end of trunk	= 1 unit below seat.	From navel to *os pubis*	= seat.
Each eighth equals about 8¾ inches.		Each eighth equals about 8⅜ inches.	

No. 2, or second factor of stature, is the distance between the two points where the limbs (arm and leg) are set in their sockets, that is technically from *top* of glenoid cavity (shoulder-joint) to top of acetabulum (hip-joint)—(See Fig. 7)—from joint to joint. This space is equal to two heads. Now notice—

Its upper boundary is distant from crown of head one head four units.
Its lower ,, ,, ,, ,, three heads four units.

To reduce this to practical use, by deducting the head from the first of these measurements, we get a quantity of four units, which takes us to the bony (not muscular or fleshy) top of shoulder—the acromion in anatomy. Allowing for the fleshy covering of the deltoid muscle, which raises the height of shoulder head about one unit and therefore reduces the quantity, we find the average "height of neck" to be three units or thereabout; and standing in proportion to the second division of No. 1 factor, or in plain tailor language depth of scye, as 3 is to 9, or about one-third of it.

ANOTHER FACT.

We notice a space of four units between the projections of haunch-bone (or pelvic-bone) and hip-bone. The use of this knowledge is to give us a sound guide in determining the length of the pelvic portion of the body; thus these *four* units added to the *five* from hip-bone to end of trunk gives us nine units, which is an average distance from natural waist to top of leg seam for a figure of ordinary height. We may compare this with Wampen's reckoning as follows:—

Marshall—from haunch-bone to hip-bone = 4, plus from hip-bone to top leg = 5 = 9 units.
Wampen— ,, ,, gluteal, or seat line, 8 units plus 1 unit = 9 ,,

Here, then, we have a natural guide for rise of trousers. (See all this reduced to practical working under Rules.)

No. 3, or third factor, is the upper limb or arm, to be treated of later on.

No. 4, or fourth factor, is the lower limb or leg. As diagram shows, it begins where No. 2 factor ends, at the acetabulum or leg-joint. It has three natural divisions: the femur, which equals in length 2 heads 18 units; the tibia, or lower leg-bone, 1 head 5 units, *i.e.*, 14 units; and the foot 9 units; in all 41 units.

To find the standing height Marshall gives the following rule:—

Add the length from crown to hip-joint, which is 3 heads 4 units (reckoning 9 units to a head) = 31 units; to length of leg = 41 units; deducting, however, 5 units for extension of foot, thus:—

$$31 + 41 - 5 = 67 \text{ units.}$$

This, he points out, is nearly equal to the same number of inches in Nature (being somewhat less), and agrees with an average seven and a half heads. For the classical eight-head canon is obtained by extending the foot as explained by M. Rochet.

SECTION XI.

PROPORTIONS IN THE ADULT FIGURE.

THE OCTAVAL DIVISION OF WIDTHS.

The two last sections showed how the human model was divided, in respect of length, into eight parts; we have now to show how it has also been similarly separated widthways, namely, into eight parts. The dividing lines are shown on Figs. 6,* 8, and 9.†

1. **Front line.**—Passes through middle of cranium and lower part of skull, along centre of sternum and abdomen, and proceeds vertically to the ground. The inner part of legs are apart as follows:—at thighs one inch, at knee-joint half an inch, at ankle one and a half inches, at toes an angle of 45 degrees.

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* Page 30. † Page 34.

2. **Back line.**—Passes along back of head, centre of back, immediately over vertebral column and coccyx, and proceeds vertically to the ground. The heels are supposed to touch.

[These two lines divide the model into two equal portions—a right and a left portion.]

3. **Right lateral or side line.**—Passes in front of *right* shoulder joint (just in advance of upper head of humerus), through hip-bone (the projecting part of the ilium) and thigh (*i.e.*, the extremity or rounded head of the femur), and proceeds vertically to the ground.

4. **Left lateral or side line.**—Takes a similar course but through the *left* side of figure.

[These two side lines divide the model into two equal portions—a front and a back portion.]

Thus we have a *quadruple* division, and even if we went no further, this of itself, coupled to an acquaintance with average measurements for each part, would be of great practical use to the student of form.

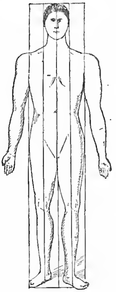

FIG. 8.

5. **Right mammaral line.**—Is a perpendicular one commencing at a point on clavicle or collar-bone, just about midway between its two extremities, *i.e.*, shoulder-head and top of breast-bone, near the side of neck, thence passing downwards through the nipple, centre of front waist, and of thigh, middle of patella, along ridge of shin (or tibia), and passing through tarsus (or ankle).

[This line sub-divides the front of model on its *right* side into two portions.]

6. **Left mammaral line.**—Takes a similar course but on the *left* side of front of figure.

[These two lines further divide the front of model into four portions; they also divide the front of legs into two.]

7. **Right scapula line.**—Is a perpendicular one commencing at a point on the spine of the scapula or blade-bone, near the *right* side of neck, thence passing downwards through lower angle of blade-bone, crossing the waist at about one-eighth of its circumference from centre of back, traversing the gluteal region and along the centre of back of lower limb, terminating just outside of heel, supposing the latter to be touching its fellow, as in military attitude.

8. **Left scapula line.**—Takes a similar course but on the *left* side of figure.

[These two lines further separate the back of model into four portions, right and left. They also divide the back of legs into two.]

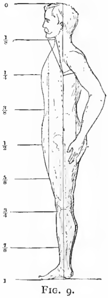

FIG. 9.

SECTION XII.

THE TAILOR'S NORMAL FIGURE.

THE MALE.

It is very important that the student of Form should have a clear conception of the Normal or Proportionate Figure. It is his standard from which he is to calculate and estimate differences, not in the matter of simple height and chest only, but in the more detailed sectional quantities. Such conception will assist him in various ways:—

1st. In *reading his measurements*. This means a comparison of them—*a*, in respect to each other; *b*, in respect to those of the standard. The former assists his judgment in estimating the general peculiarity of his client's form; the latter indicates what departure, if any at all, from the proportionate figure. If the operator does not know Proportion he cannot know Disproportion.

2nd. It gradually increases his knowledge of Form, and makes him less dependent on measurement.

3rd. It educates his powers of observation, or calculation, whichever for the time being he has to fall back on.

How are standards obtained?

They are not mere ideals, but are properly a *mean* gathered from a large number of cases. True it sometimes happens that a standard becomes recognised which is not the best reflection of actual averages, the reason for its adoption probably having been of some special kind. Dr. Wampen takes the *Apollo Belvedere* as his type, and gives us 64 in., or 5 ft. 4 in., for a normal height, being the mean of 4 ft. 10 in., and 5 ft. 10 in. This is generally considered somewhat short for a normal model.

Now there are two or three ways of getting an average standard of height. Common observation suggests that we place our minimum extreme at five feet, and our maximum extreme at six feet; this boundary would include the vast majority of men, and would give us an average height of 5 ft. 6 in. But a truer way would be to include as large a number of men as possible, taken promiscuously. Now this has been done. Measurements taken in the European armies show that out of 315,620 white men, a mean height was revealed of 67 in., or 5 ft. 7 in. Also in ordinary experience we find that a man measuring 5 ft. 6 in., or 5 ft. 7 in. is acknowledged as of average height. The tailor's normal figure may therefore be rightly acknowledged as 66 in. or 5 ft. 6 in.

Breast measure may be similarly obtained. If we take the tailor's extremes in models, from the boy of 24 breast to the corpulent man of 48 breast, we get an average breast 36 in. This is confirmed if we take the ordinary sizes of men which will include the vast majority, say from 33 to 39 breast, which gives us a mean of 36 in breast. It will be found, however, that a very large number of men do not reach this standard. The average chest circumference of 315,620 men measured for the army was 33·17 in. This probably means under the clothing, and allowing for shirts and waistcoat would give us 35 chest, which is a very common measure, but fails to reach the standard.

The next important point is the *proportionate waist.* This is generally reckoned as one-sixth less than breast measure: thus, for 36 breast, 30 waist. But this is more ideal than actual, for the "nearness" is rarely "reached"; yet it is a pity to disturb an existing canon. At the same time, a difference of one-eighth more truly represents what we find among actual customers; thus, 36 less one-eighth equals $31\frac{1}{2}$, hence we find that houses that use block patterns generally adopt a size of 32 waist for 36 breast. The next is *natural waist length.* A reference to our sections on "Proportions in the Adult Figure" will show that this quantity comprehends two of the eighth divisions, *i.e.*, one-fourth of total height; to this a half inch must be added on account of the tailor's measure being a surface one, following the natural curve of the figure, and not a vertical one, hence the additional half inch.

Further dimensions are given below.

Principal Measurements of Normal Figure.

Height	5 ft. 6	in.	
Breast measure ...	36	,,	
Waist ,, ideal	30	,,	= $\frac{1}{6}$ less than breast.
,, ,, average	32	,,	= $\frac{1}{8}$,, ,,
Seat ,, ...	$37\frac{1}{2}$	,,	= breast measure plus $\frac{1}{24}$ of itself.
Shoulder ,, ...	27	,,	= $\frac{3}{4}$ total breast, thus, $36 - 9 = 27$ in.
Upper shoulder measure	28	,,	= the above plus 1 in. [This is taken from nape of neck under arm, to nape again.]
Back width ...	$7\frac{1}{4}$	,,	
To elbow	$20\frac{1}{2}$	,,	= natural waist and nett back width less height of neck.
Elbow to hand ...	10	,,	= Being the mean of 9 & 11, which embrace nearly all sizes.
Height of neck (about)	$2\frac{7}{8}$	,,	
Depth of scye ...	$8\frac{3}{4}$	,,	
Natural waist length	17	,,	= $\frac{1}{4}$ total height plus $\frac{1}{2}$ in.
Over-shoulder measure	$43\frac{1}{4}$	,,	= breast measure plus $\frac{1}{5}$ of itself.
Front of scye ,,	12	,,	= $\frac{2}{3}$ of breast measure.
Cross chest ,,	$16\frac{1}{2}$	,,	
Leg length ,,	31	,,	= half total height less 2 in.
Rise ,,	$9\frac{1}{2}$	,,	and amount required above waist.
Round knee ,,	$13\frac{1}{2}$	,,	
Small ,,	12	,,	
Calf ,,	$13\frac{1}{2}$	,,	
Scye circumference	17	,,	= $\frac{1}{2}$ breast *minus* 1 in.
Neck ,,	16	,,	(See also under Part III.—Rules.)

For the benefit of those who require confirmation as to the reliability of the foregoing list, and desire a scientific basis for it, we submit the following comparison :—

A list of Scientific dimensions compared with Tailors' measurements.

SCIENTIFIC DIMENSIONS.		TAILORS' MEASUREMENTS.	
1. From chin to the level of the inner end of clavicle ...	3 units.	1. Compare with space between neck point and gorge line about $\frac{1}{8}$ breast measure [Compare also with Wampen's clavicular line.]	3 units.
2. Length of sternum or breast bone	6 ,,	2. Compare with vertical diameter of scye, nearly equals	6 ,,
3. Both the above quantities added together	9 ,,	3. Compare with depth of scye, nearly equals	9 ,,
4. Vertical length of scapula...	6 ,,	4. This nearly agrees with No. 2 as above, in quantity, but in position is lower down the figure, so that the ordinary bottom of scye line passes over blade-bone about one or two inches above its lower angle.	
5. From nape to hip-joint, 2 heads 4 units, say 17 plus	$4\frac{1}{4}$,,	5. This includes natural waist length and downwards to the hip, say 17 plus	$4\frac{1}{4}$,,
6. Across shoulders through deltoid prominences = $\frac{1}{4}$ total height, or 2 heads (in men this is the greatest breadth)	17 ,,	6. Tailors have no corresponding measurement, but the difference between this and No. 8 should be compared with the breast and over-shoulder measures, which difference averages 7 units.* This latter being a surface measure, accounts for the three or four units over No. 6 dimension.	
7. Width between centre of nipples, one head, or ...	9 ,,	7. Compare mammaral lines (page 34).	
8. Width from acromion to acromion across shoulders	14 ,,	8. Compare ordinary back width, not reckoning extra for fashion	14 ,,

The total width of a man with arms extended corresponds very frequently with his total height, so that he may stand in a square. If so, a measure from centre of back to end of second finger will equal half his height. In the majority of cases the cross quantity will exceed the height by about $1\frac{1}{2}$ inches. Also, if the arms be uplifted and the legs outstretched, both at an angle of about 30 degrees corresponding with each other, and then a circle described with the navel for a centre, the extremities of arms and legs will usually touch the circle.

We thus see that there is a law of proportionate growth applicable to the human figure, or, to use Mr. Roberts's words,

"Nature aims at a perfect type,"

and may be said to nearly reach it. D. R. Hay, Esq., in his work on "Natural Principles of Beauty," has gone into this very minutely. It is not required that we follow these details, but it is very necessary that every student of Form should have a clear, definite, intelligent idea of what is meant by the proportionate type.

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* See page 36, opposite.

SECTION XIII.

THE TAILOR'S NORMAL FIGURE.

THE FEMALE.

The female form follows the same laws of growth as that of the male with a few exceptions. It may, however, be said that in the former case nature not only aims at a perfect type, but more frequently realizes it [assisted, it must be confessed, by art], for—"She tried her 'prentice hand on man
And then she made the lassies, O."

First, the height. This is generally set down at 5 ft. 3 in. There is a tendency at the present era for females to grow taller owing, we suppose, to improved conditions of health and exercise. Besides this general fact, we find the average gives this quantity; thus, taking the minimum of shortness at 4 ft. 10 in., and the maximum of tallness at 5 ft. 8 in., which embraces all ordinary figures, we get a mean or average of 63 in., or 5 ft. 3 in., being 3 in. shorter than men. But, we repeat, women are growing taller.

Breast measure.—Here we find a distinct feature belonging to the female form owing to the special development of the *mammilæ*. A measure taken here does not serve for proportions even so conveniently as in man. The normal size is found thus: the lesser extreme is the same as in boys, namely, 24 in., while the maximum is 44 in.; this gives us the ideal type of 34 in. bust.

Waist measure.—This is two-thirds of bust, which in the normal is 34 in., leaving $22\frac{2}{3}$ in. for waist. That is one-sixth of breast greater difference than in men.

Seat or hip measure.*—Is bust added to one-sixth of itself; in normal is $39\frac{2}{3}$ in.

Shoulder measure.—This averages 24 in., or one-twenty-fourth less than that usually obtained from men in figure of same size breast.

Upper shoulder.—The above plus $\frac{1}{2}$ in.

Back width.—One-third breast or bust measure.

To elbow.—Similar to men, natural waist length added to nett back width less height of neck. For instance, natural waist for figure 5 ft. 2 in. is $15\frac{3}{4}$ (see below); this added to back width $5\frac{3}{4}$ equals $21\frac{1}{2}$ in., less height of neck $2\frac{1}{2}$, is 19 in.

Elbow to hand.—Is $9\frac{1}{2}$ in., being mean of $8\frac{1}{2}$ to $10\frac{1}{2}$ in., which are the limits for short and tall figures. It should be clearly understood that this measurement is from the point of elbow to the wrist-bone, this latter being the natural boundary of arm and hand.

Height of neck.—$2\frac{1}{2}$ in.

Depth of scye.—$8\frac{1}{4}$ in.

Natural waist length.—$15\frac{3}{4}$ in., being nett one-fourth of total height, the additional half-inch scarcely being necessary, owing to the erectness of figure and flatter surface of back.

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* Properly speaking, these are not identical (see under Rules).

Over-shoulder measure.—This generally bears a close resemblance to hip measure, which we saw was equal to bust circumference plus one-sixth of itself. It differs from the ordinary breast measure, whether in men or women, from 6 to 8 in. With men it approaches the larger quantity, while in women it recedes closer to the smaller. It is a dimension useful in cutting capes and cloaks.

Front of scye.—Equals two-thirds of shoulder scale (not bust).

Cross chest.—What front of scye gains this measure loses, and *vice versâ*.

Leg length and Rise.—The same rule as for men, except that ½ in. may be deducted from leg and added to rise for extra pelvic size.

A perfectly formed woman will stand about 5 ft. 5 in. (that is 2 in. in excess of the above average) and should weigh about 125 pounds.* Her shoulders and hips will touch a straight line vertically drawn, and her waist will taper in gradually to the proportions given above: 12 in. difference between bust and waist for 36 in. breast. She will therefore stand in a frame. The above quantities should be compared with the list of Working Rules in Part III., where sometimes additional and simpler calculations are given.

SECTION XIV.

SECTIONAL DEVELOPMENT, OR GROWTH OF PARTS.

The present chapter is, in the judgment of the Author, one of exceptional utility and importance, because it deals with Form-growth according to practical need. It is not enough to know the proportions of a normal figure, such knowledge would only guide us as to what our model *ought to be;* what we do want is sound information concerning how the figure grows in its separate parts; the pursuit of this, while the most useful is probably the most difficult branch of our inquiry.

It is evident that if the **reign of law** controls human growth when the figure is considered in its entirety, it will also control the development of its several parts. Indeed the whole must necessarily include each constituent portion. The divisional system as already advanced will be our basis. By this, it will be remembered, the body is separated in its height and girth into eight parts respectively, hence it is called the **octaval system.** Its dividing lines, as already laid down, will serve as boundaries to be used as necessity requires for elucidation. We proceed, therefore, to inquire as to laws of growth in those sections of the human figure with which all tailors, quite irrespective of their special systems, have to deal.

On next page will be found a Chart, the purpose of which is to illustrate this **sectional growth** in the adult male form. This Chart consists of a number of lines drawn in different directions. The vertical ones represent lengths; horizontals show breadths; oblique lines indicate lengths and breadths combined. Each line has attached to it a self-explanatory name.

Taking the heights we find the No. 1 line is a **standard** by which to reckon the others. It represents *not the total height itself*, but twelve inches, which is the *difference* between ordinary forms of men, say from 5 ft. to 6 ft. in stature.

To make this clear take No. 2 line, which shows the variation in length of different men's legs. This line goes beyond the dotted half line, but not much beyond. Here at once is exhibited a principle—that **leg lengths** vary more in

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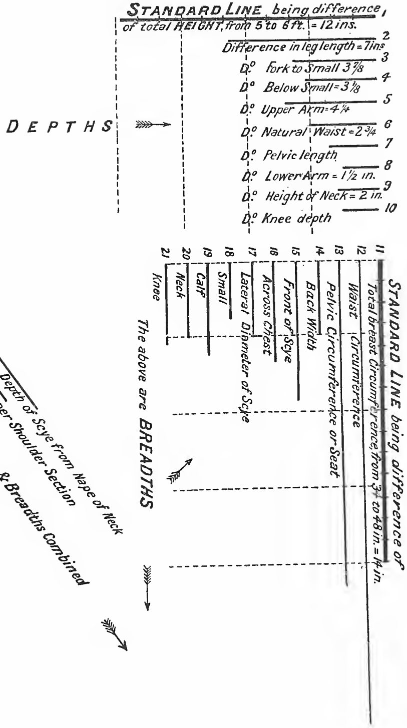
* This is from a quite recent estimate, and with all due deference to the authority whence it comes, we prefer to regard the " normal " as previously put down, whatever the " perfect " may be.


STANDARD LINE being difference,
of total HEIGHT, from 5 to 6 ft. = 12 ins.
2
Difference in leg length = 7 ins.
3
D° Fork to Small 3 7/8
4
D° Below Small = 3 1/8
5
D° Upper Arm = 4 1/4
6
D° Natural Waist = 2 3/4
7
D° Pelvic length
8
D° Lower Arm = 1 1/2 in.
9
D° Height of Neck = 2 in.
10
D° Knee depth
DEPTHS
11
STANDARD LINE being difference of
Total breast Circumference, from 34 to 48 in. = 14 in.
12 Waist Circumference
13 Pelvic Circumference or Seat
14 Back Width
15 Front of Scye
16 Across Chest
17 Lateral Diameter of Scye
18 Small
19 Calf
20 Neck
21 Knee
The above are BREADTHS
22 Depth of Scye from Nape of Neck
23 Upper Shoulder Section
The above are Depths & Breadths Combined

proportion than the total heights of men vary; so that any system or calculation which attempted to find the length of leg by an exact proportion of height would not be quite correct.

Again, compare lines 5 and 8. Here it is seen that the **lower part** of **arm** does not change its length so much as the upper part of arm. Again, the line of **natural waist** (No. 6) is seen shorter than one-fourth of total height. This is to show at a glance that such a dimension changes less than any given proportion of the total height, but only a little. Once more, among the breadths the waist line appears very long (see No. 12). This reminds us, *not that the waist is larger than the breast*, but that variation takes place to a greater extent in the waist circumference than in any other breadth locality, consequently it is not subject to any rule known to us.

Another point we may notice. The **calf** line is longer than the **knee** line (see Nos. 19 and 23), which shows that these two measurements do not change at the same rate. In plain words, a man's calf varies more than his knee does.

There are two lines drawn obliquely. This shows that the sections they represent are neither entire length nor entire breadth, but partake of both. One of these is called **depth of scye.** This term is used in the ordinary or old-fashioned tailors' sense, that is from nape of neck to bottom of arm-hole. It therefore includes two sections—height of neck and scye diameter; as such it may logically be regarded as a combination quantity, and is generally treated so.

The other combination quantity is from the clavicle or gorge line to neck point. It is the upper part of shoulder length, and anyone, by noticing the human form, will see at once that it is part length and part breadth.

This chart may be suggestive to those who are endeavouring to perfect self-adapting systems of cutting, for it is very evident that such methods should be sectionally adjustive according to the sectional growth of the figure in nature. To ordinary persons it should also be useful, as it is, when taken in conjunction with other parts of our book, at least provocative of thought and further investigation.

We are now prepared to pursue our inquiry as to the growth of the eighth divisions.

Leaving the head as first eighth, we come to the second eighth. In the back this is from nape of neck to bottom of arm-hole, and is cut up by nature herself into two unequal portions, their proportions being as three is to five. A line through shoulder head is their dividing boundary. That which goes *above* top of shoulder is termed height of neck, level of shoulder, or, among dressmakers, shoulder slope; that which goes *below* is the vertical diameter of arm-hole.

HEIGHT OF NECK, OR SHOULDER SLOPE.

Experience shows that this part varies from two to four inches, taking these quantities respectively as *minimum* and as *maximum*.

But the majority of forms will be covered by still smaller limits, namely from two and a quarter to three and three-quarter inches, giving a variation of one and a half, and a mean average of three inches.

For quite ordinary every-day figures this amount of variation may be still further reduced as between two and a half and three and a half inches, and this quantity of one inch would even then include such forms as are usually described as "rather short neck," and "rather long neck" respectively. For it must be remembered that when a man or a woman becomes broad and stout they *appear* to be shorter necked than they usually are, and the reverse is the case of very slender forms. Height of neck being a portion of the back-bone is generally regarded as length, and this seems logical enough, but as a matter of fact system makers have not always so regarded it. In breast measure systems its required quantity is practically obtained from width. Both methods have something to recommend them (the former being preferable), but neither of them is quite satisfactory, because the extent of its variation and the direction of its change are not in proportion to the natural waist length, or to the chest measure either; although of course millions of garments have been cut, and will be again, by both methods, but that is not our point.

The variation referred to seems to arise from two causes—one, the anatomical formation of this region, which leaves the shoulder girdle free for movement, not being fixed by bony articulation, and another which will be understood best by considering at once the

SCYE OR ARM-HOLE.

A reference to the Chart on page 40 will show that this arm-hole depth is regarded there as a combination of length and width. It is so for this reason: if we reckon the arm-hole as a circle (and we have already seen that practically it may be so reckoned, see page 20), it is at once evident that all its diameters are equal; hence its depth equals its width, and as the one diminishes or increases, so will the other. For instance, A, C, B, D (Fig. 11) is the same in its size as H, C, E, I, G, although the true circular outline is departed from between C and E, and between E and I. The arm-hole therefore becomes elliptical, being deepened at its lower front part where the chief friction and movement are, and flattened correspondingly in its lower back part. But it will be observed that this alteration of contour does not practically affect its depth in A B or its width in C D, while its upper parts C H and D G equal in their aggregate C A and D A.

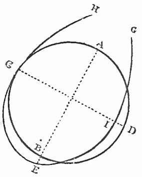


FIG. 11.

Further, to understand the tendency of growth in this arm section, it is necessary to remember that the position of point C (Fig. 12), that is, bottom of arm-hole, or technically, the *fovea axillaris* point, follows in some degree a law. Anatomically it is controlled by the position of the shoulder-bones on the ribs (for instance, the bottom of blade-bones generally reach to the seventh rib), and anthropometrically it aims, as it were, at a distance of one-eighth of height from nape of neck.

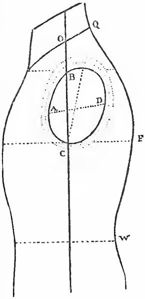


FIG. 12.

Observe first, the one-eighth measurement is a *vertical* one passing through the figure, whereas the cutter has to do with a *surface* dimension which will vary according to the external form. For instance, let O C (Fig. 12) stand for the vertical or median line, and Q F the back surface of the figure. This latter will at all times exceed O C. In cases where manual labour, sedentary occupation, physical weakness, or other causes have developed the back muscles or interfered with a normal upright attitude, it becomes longer still. When effected by muscular growth the extra length will be chiefly found in E F; whereas if it is a case of attitude, such as the head forward or stooping gait, Q E will be lengthened; or, in curvature of the spine, the elongation is often spread from Q right down the back to the waist W.

Observe secondly, the sub-sections B C and B O are **compensatory**, what one gains the other loses; and inasmuch as C to some extent follows a rule, as explained above, it will be found that the variations in scye diameter take place *mainly above* and not *below* point C, as shown by the dotted lines. The result is that, as in the adult figure the stature and its constituent parts of height do not increase, and accordingly scye depth C does not get much lower, the height of neck or shoulder slope B O is reduced as the arm-hole enlarges. Hence it is that we commonly find stout and muscular forms with short necks, even if their height is ordinary; and on the other hand, spare forms with long necks or sloping shoulders are frequent. In each instance the height of neck has lost or gained as the scye has gained or lost.

Let A, B, C, D (Fig. 12), represent a scye of a young man twenty years of age. Ten years later the same figure has grown stouter in chest and the whole of scye region. The form of enlargement is shown by the dotted lines. Outward and upward it has expanded; there is however but a slight increase of depth at C. Ten years later a further growth has taken place: C has deepened a little, but at sides and top the curve has considerably altered. The scye diameters have increased in depth and in width, and the section above, namely, height of neck, has been thus encroached upon. We have therefore a bigger arm accompanied with a shorter neck.

Observe thirdly, if such is the case, it seems logical and also practical that the scye depth from nape to bottom of arm-hole should be determined by a combination of length and breadth, and also in such a manner that the two sub-sections shall gain or lose compensatingly. This is, therefore, done in our List of Rules (see page 58, under Height of neck), because length and breadth are continually counteracting one another. In connection with this present section (which has hitherto been limited to the back of figure), we must consider its corresponding front portion, which is generally termed

SHOULDER LENGTH.

This part extends widthways from the front to the lateral or side line, and lengthways from shoulder neck-point to the bottom of arm-hole or base line (see C, F, E, Fig. 13). Although often regarded as one section, and practically treated as such, it is really divided by Nature into two parts by the gorge, or, as it is sometimes called, the sternal line; this latter name because point B is supposed to rest on the top of the sternum or breast-bone, which is the division of neck and of chest. We have therefore an *upper shoulder section*, B, A, D,

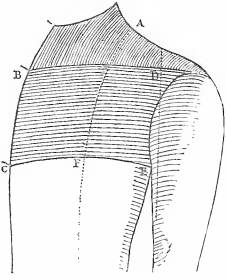


Fig 13.

and a *lower shoulder section*, B, D, C, E. Just as the back was found to be controlled by the elements of length and breadth, so is the front; for it is evident that as the chest is developed, say from F to C, so the surface line indicated by A, B, C, increases; at the same time the octaval law represented by the sectional line A F keeps it in check. We have, therefore, length and breadth pulling against each other, and their manner of action is similar to that dealt with in explaining the back of figure. It will not be necessary to repeat our observations. (Compare Chart, where upper shoulder section is shown as a combined quantity.)

BALANCE.

It is in these compensating sections of the scye and upper shoulder that what tailors call **balance** chiefly operates; we say chiefly because the fulcrum or point from which the balance is reckoned is variously situated, sometimes it being at the natural waist, and there is no doubt that in some figures the relative quantities which constitute balance are lower down than above the base of scye. As balance will be dealt with in our Balance Table, we need only say here that it consists of the relative proportions of back and front, and is affected by attitude, muscular development, &c. When the back is flat and small and the chest extra large the balance will be affected, because it is made up partly of width and partly of length, and this very idea suggests that some portion of the quantity lost in the back must be deducted from that part and added on to front, which has gained accordingly. Thus is there a beautiful equipoise throughout the entire economy of the human form.

The **practical outcome** of the foregoing considerations will no doubt be evident.

Notice *firstly*—that the measurement round the arm (*i.e.*, scye circumference) bears a close relation to the size round the chest (*i.e.*, breast measure). As a man or a woman grows in his or her girth so each one will increase in scye region, for the lateral diameter of the arm-hole is itself included in the chest measure. The evidence coming from various systems of cutting testify of the same thing. The majority of systems obtain the depth diameter of arm-hole either from breast, shoulder, or front of scye measures. The first and last of these are purely width quantities, and the shoulder measure is so chiefly, and yet experience proves that the principle is fairly sound in practice. And it must be so because of the nearly circular form of the scye itself. Where breast measure systems have principally failed is when no distinction has been made between the two sub-sections included in the space between nape of neck and bottom of scye. In large stout figures it is the upper portion, namely the height of neck, which has become too long, proving that a wrong principle was at work in that particular region.

Notice *secondly*—If a proportion of the breast measure be taken for depth-diameter of scye it must always be **imperfect**, because it makes no provision for **balance**, or changes of **attitude**, but leaves the corresponding back and front portions of the scye the same length, whereas they ought to be compensative. As a matter of principle, therefore, the shoulder measure, or front of scye measure, are preferable for use as divisors. They suggest "the give and take" practice: what the back loses from the normal the forepart must gain in its corresponding section, and *vice versâ*.

The next point to be considered will be

THE LUMBAR SECTION.

Its upper and lower boundary is scye line and natural waist line respectively, whereas the two lateral lines running through the side of figure will divide it into front and back areas. The term lumbar does not convey an exact idea of locality, as properly speaking the lumbar regions are too low down for our purpose; but it is a word fairly familiar to most people, and so may be used. The front part of such a surface ought to be called the abdominal region, but there seems such a disinclination amongst tailors to accept any terms, however useful, that are not strictly easy and conventional.*

This section is by no means so complex a part as that just dealt with, and its length, when undisturbed by elements of breadth in its neighbouring parts, is less subject to change in proportion to the entire height. The reason is clear. We are now leaving the chief muscles used in working the arm, and those in lumbar region being less used are, according to law (see Section VII.), not so liable to change of bulk. Therefore this part approaches its ideal of one eighth more nearly than some others do. A reference to our Diagram of growth of parts will show this at a glance. At the same time our ordinary measurement being a surface one, and not strictly vertical, it is not to be expected as mathematically exact to its proportion.

But though less liable to change from direct reasons, this very portion (which it is well to keep in mind answers to the under-arm measurement in ladies) is affected considerably by the changes in contiguous parts. For instance, let an adult of either sex who has ceased growing in stature continue to increase in chest and shoulders, the enlargement of scye, as we have seen, takes place *partly* downwards. A simple diagram will illustrate what we mean.

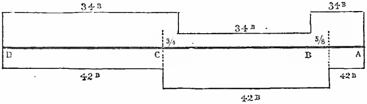


FIG. 14.

Let A D represent length of back for a lady with measures as follows: chest 34, waist length 15. Here then the waist length is divided into three parts—A B is shoulder slope, B C arm-hole depth, C D under arm. In the course of years the same person grows to 42 chest but nothing in waist length. Where then has the change taken place? We shall probably find that A B has lost about five-eighths or more, and the scye at C has encroached on the under-arm length about three-quarters of an inch. C D has lost therefore three-quarters of an inch.

If the growth of this under-arm length was strictly in accordance with the entire height, taking as limits 4 ft. 10 in. and 5ft. 8 in. (as mentioned previously, page 38), its amount of variation would be from 7¼ in. to 8½ in., a difference of 1¼ in. only. But in place of this, experience teaches that Nature's variations are three times this amount, namely, 3¾ in., ranging from 5¼ in very stout and short persons to 9 in. in the taller and thinner. And it is satisfactory to know that all the intermediate quantities can be ascertained with a nearness sufficient for practical purposes by the careful practice of one or two simple rules.

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* Tailors certainly have need of terms for distinguishing between that part of the back which is above, and that part which is below the blade-bone; and what better terms can they have than those which are recognised amongst scientific men, namely, *dorsal* and *lumbar*?

HOLLOW OF WAIST.

Another point to be noticed while under this section is the natural recession or hollow of waist in the back. In the ordinary figure, reckoning from a vertical line touching the most prominent part or brow of seat, this hollow is generally put down at 2¼ in. In Wampen's "Anthropometry" the median line (*i.e.*, the imaginary middle line through the figure) is diverted towards the waist, and the learned author explains fully all the measurements on which he founds his elaborate system; but for practical purposes it is best if we keep to the lateral or side line described previously. This passes through front of arm-hole, proceeds downwards, and cuts the waist into a front and a back portion, giving half to each. (See Rules.) Of course **attitude** changes the *position* of this centre waist-point with respect to the upper front and back portions of the figure as revealed by balance measures, but it does not affect to any important extent the *distribution* of waist.

WAIST DISTRIBUTION AND CORPULENCY.

The Chart (page 40) shows by the length of the waist line that the part represented by the latter changes a great deal in various individuals, and sometimes also in the same individual. An instance of this came to the writer's knowledge a short time ago. A young man 22 years of age had a 22 in. waist, the same person twenty-two years later had a 44 in. waist. He had added at the rate of 1 in. per annum during that period. This was an exceptional case, but it is a fact that the waist size, both in males and females, is extremely variable. No rule to cover all cases can therefore be given, but for ordinary male forms (34 B to 39 B) we have given seven-eighths of breast, and further rules for extreme sizes. (See Rules and Tables.) The writer has also known cases where in females the waist size has exceeded the breast.

CORPULENCY.

We have said that the front part of the section now under consideration ought to be called the abdominal region, and this will remind us that corpulency should now be dealt with. What do we understand by this term? Properly speaking, it differs in meaning from stoutness and from lustiness. Lustiness is a healthful state, and "consists of a due and full proportion of all the solids in the body."* Stoutness respects the state of muscle and bone; it is a natural property, and has to do with the make of the body with which one is born; but corpulence, although often constitutional, may result from circumstance; it is not natural but is generally associated with disease. It consists of an undue proportion or superfluity of flesh or of fat, usually the latter. Some writers on cutting have defined corpulence as consisting of two degrees. The first degree includes all figures whose waists exceed the normal (reckoned in men as five-sixths of breast, in women as two-thirds of breast); the second degree includes all figures whose waists exceed the breast. Now this definition may serve for ideal purposes, but it properly defines abnormality rather than corpulence. The student of Form will do better to follow on generally accepted lines. Hence corpulence, he understands, as a superfluity of matter in *undue proportion*, both in respect to its quantity and its distribution. Dr. Wampen has pointed out that in the majority of cases this distribution is only a small amount at the back, nearly one-third at sides, and nearly two-thirds at front, and this is confirmed by experience fairly well; this of course would be reckoned from the median line. Owing to the "undue proportion" of size going to the front, it becomes necessary for a corpulent person to change his attitude in order to find his centre of gravity. The upper part of the body is thrown back from the hip-joint, and consequently the lateral line, which we have seen passes through the front of scye, is deflected backwards; but this does not make void the rule for distributing the waist evenly each side of lateral line (see Rule, Waist distribution), because two-thirds of the chest or scale size has already been given to front of scye. Or in other words, this quantity increases in a greater ratio than the corresponding quantity given to the waist, consequently the latter is still suppressed in spite of the change of attitude. The "West-End System" is adapted to follow Wampen's rule of distribution—two-thirds going to the front. Both methods are good, one being more applicable to an evenly distributed waist, the other to a figure of front prominence.

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* Crabb, Eng. Synon.

NATURAL WAIST LENGTH.

The present with the foregoing section comprise about one-fourth of total height. Separately they take in the dorsal and lumbar parts of the back, and together make up exactly the natural waist length. And now the useful question arises, will one-fourth of total height give us the length of waist in most cases, or does it apply only to the normal? The answer is this: first add for men half an inch to the one-fourth of height to allow for the difference of a surface measure from a vertical one; and for women, who generally have flatter backs, a quarter of an inch. Thus, for a man 64 in. high the natural waist would be 16½ in., and for a woman 16¼ in. With this addition the rule will be correct enough for all ordinary cases; and for this reason, the waist length corresponds with a portion of the vertebral column. This column, roundly stated, is three-eighths of total height. Now it is a fact in anatomy that the trunk and back-bone are much less subject to altitudinal change than the limbs. The law of growth in the axial or trunk portion is ascertained to be as follows: at birth it is three heads; four years, same ratio; nine years, three and a quarter heads; fifteen years, the greatest change has taken place, it is then three and three-quarter heads long; at twenty-five it is four heads. Differences of height are chiefly caused by differences in lower limbs. Not only so, but the portion of trunk comprised in the waist length is that which is least subject to any disproportionate growth. Its elongation chiefly takes place in the dorsal region, and from causes we have already mentioned: enlargement of muscles, curvature, stooping attitude, &c., all of which are elements of breadth more than of length. In such cases, and where no measure can be obtained, half an inch to an inch ought to be added to the ordinary length of waist as ascertained from height.

LAW OF GROWTH IN THE GLUTEAL AND FEMORAL, OR SEAT AND THIGH SECTIONS.

The two next Eighth sections may be conveniently considered together; they will then include collectively the whole of seat from natural waist line to mid-thigh. This part is important, embracing as it does a division of which we know too little concerning its law of growth. It has to do with four points in actual practice—

1. Distribution of seat.
2. Amount of fork room.
3. Rise or body part of trousers, &c.
4. Spring of skirt.

Distribution of Seat.

First as to the pelvic portion. This is a part of the trunk, and is also controlled by the vertebral column, but it changes more than the lumbar length above it. In women, relatively to their general size, it is larger than in men. In short figures, unless they are small and of light weight, it is larger than in tall forms—as if Nature, in her task of man-making, had so much average material wherewith to work. What therefore her models lacked in length they made up in width, and *vice versâ*. Indeed we know that something of this kind of economy goes on, because there is such a thing as an average weight which is more frequently approached than is height or breadth.

This pelvic portion, under the heading of "Rise of Trousers," is dealt with in our list of practical rules. It is set forth as a combination of length and breadth (we think correctly so); not length only, as the quantity would be too small in short stout figures; not breadth only, as it would be large for short figures. The two elements control each other. With regard to the distribution of its size of seat, it has been ascertained that one-half *less* three-quarters of an inch goes to the front, and one-half *plus* three-quarters of an inch goes to the back, their dividing point being the side or lateral line, which, be it remembered, passes perpendicularly through the side of figure, through front of scye. This gives three inches extra for the gluteal prominence.* This has to do with spring of skirt, which can be generally determined according to the principle of distribution here laid down. (See Rules, "Spring of Skirt.")

FORK—WHAT IT MEANS.

The next point connected with this section is Fork. What do we understand by Fork? Technically it is that portion of leg garments which goes between the limbs in the fork region of the body; consequently it must be a part of thigh circumference. As a rule tailors determine the required amount of fork by the seat or hip measure, and generally they are correct, because the thigh bears a relation to its trunk, being usually nine-sixteenths of seat measure. In certain figures of small limbs or abnormal seat the relation fails in being too large, or it may be in an opposite direction.

Let Fig. 15 represent a section of the thighs. Normally they are one unit apart, as from B to B. The difference existing between the aggregate thigh measures and the seat measure is shown as from X to B, or from X to A. From X to X′, where the limbs join the stem, is about one-third; half an inch must be added for space from B to C, and say a quarter of an inch for ease. Thus: $20\frac{1}{4} \div 3 = 6\frac{3}{4} + \frac{1}{2} + \frac{1}{4} = 7\frac{1}{2}$ for 36 in. seat.

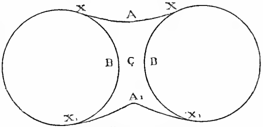

FIG. 15.

In bony, angular forms the fork often gets too large; while in full rounded forms, such as ladies often are, it is liable to be small, supposing both are taken from the seat. (See Rules.)

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* The proportion in Wampen's Plane Section of gluteal part is—front 9, back 10; that is, half an inch is taken from the front and added to the back, in order to make up the circumference of 19 inches.

SEAT ANGLE.—WHAT IT MEANS.

In comparing the plane sections of waist and seat in their posterior radii, marked respectively 3 and $5\frac{1}{4}$ (see Wampen's "Anthropometry") we have a difference of $2\frac{1}{4}$ dating both from median line, this of course representing the hollow or depression of waist. A line drawn through the two points gives an angle of $12\frac{1}{2}$ degrees, which is therefore the *natural angle of seat*. When stooping the body makes (so it is said) a further angle of $12\frac{1}{2}$ degrees (which means practically from $1\frac{1}{2}$ to 2 in. extra length), equal to 25 degrees in all. And this as a minimum has to be provided for in systems of cutting. As corpulence increases this angle will probably decrease, about one-fourth of the disproportion going to the back. In many systems fixing seat line by the waist measure provides for this. It is well to understand where the seat angle room is actually wanted, or in other words, where the strain is felt in stooping, &c. It is near the region where the hip-joint works, where the ball of the femur rotates in the synovial cavity. This is proved by garments which have not enough angle giving way at the lower part of seat line or closing seam. In the days of doeskin trousers such garments used frequently to split just at that region. In trousers systems a crooked seat angle is associated with a small fork, whereas if a large fork is provided a straighter seat angle can be worn. (For further information refer to List of Rules.)

LAW OF GROWTH IN THIGH PART.

The femoral or thigh line falls about mid thigh. The thigh bone or femur is the largest bone in the body. Its normal length is two heads (Marshall's Rule = 18 units). This quantity must be reckoned from where it fits into the acetabulum to the lower edge of knee-cap. We have said that the lower limbs are more subject to altitudinal change than the trunk, add to this that the femur increases more than the tibia. The ratio or extent of change in the axial portion from birth to manhood, we have seen, is one head. The greatest amount of growth being between the ages of 9 and 15. Deducting one-fourth from this extent of change for the head, we have the trunk proper changing its proportion as much as 6 or 7 units. But we as tailors have to do with our clients mostly from youth upwards, and the variation of proportion from 15 to 25 years is only one-fourth of a head or $2\frac{1}{4}$ units at most, or deducting the head, $1\frac{3}{4}$ units. The femur would meanwhile increase beyond this ratio say $1\frac{1}{2}$ units more. We thus notice a striking resemblance between the upper and lower limbs. Just as the humeral grows more than the ulna part of arm, so the femoral grows more than the tibial part of leg.

LAW OF GROWTH IN THE KNEE, ETC.

The position of mid thigh, knee, small, calf, and ankle, in respect to the length of leg and the height of figure, are dealt with in the List of Rules; also their average proportions.

The formation of knee needs attention—FIG. 16. The left hand of diagram is the outer part of leg. A A′ passes through knee-cap, which is about two inches in size from top to bottom. Below knee-cap at outer part of leg there is a gradual hollow, the centre or most pronounced point of which hollow is about two inches lower than middle of cap. The small, or leg seam indentation, is an inch lower still, or three inches (about) from centre

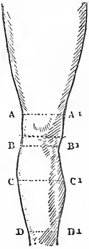

FIG. 16.

of knee. These hollows not being opposite one another explains the frequent discrepancy noticed in measurements taken for breeches lengths. The inside hollow (called properly tibial indentation) is much more defined, and is accordingly a better point for measurement. Sometimes the outer hollow is much deeper than at others. The knee circumference being dependent on bone, while that of the calf is largely muscle formation, the former is more easy to calculate from other parts, as also is the small.

SECTION XV.

TYPES OF FORM—ARRANGED ALPHABETICALLY.

It has been distinctly stated in the Preface of this work that its chief aim is to be educative to the mind and eye of the student. By this is meant that his **own powers** of attention, observation, comparison, and inference are to be quickened and encouraged, rather than any practice recommended of trusting implicitly to details of measurement or classification, however correct they may be. By the first process he is put into possession of certain broad facts and principles, after which he is left free to do his own thinking and work out his own experience; by means of the second he would be irritated and checked by figures, quantities, and rules, which were primarily intended for his help and guidance. At the same time we must have rules and quantities in order to bring definitely and correctly before us what would otherwise be too hazy, abstract, and therefore useless; consequently what follows in this section should be read in the light of our main idea, for the writer well knows that it is impossible always to classify forms or to fix on precise quantities the same as one could easily do in the world of mechanics.

The following list includes the chief types of form, whether of male or female:—

Angular figure.—Some forms are sharp and angular; the framework is thinly covered with muscle, yet sometimes that frame is large. As a rule they require garments larger than their chest measure indicates, and the surplus size filled up. This is nearly always so with men having broad square shoulders, the shoulder girdle being large compared with the thorax, and frequently also compared with the framework of hip. Their hips therefore appear small, and the garment "hangs off." This type is often found with prominent blades. The angular finds its opposite in the Round Form (which see). It is the bony rather than the fleshy figure.

Arms backward or forward.—In some cases the arms are set on the ribs further back or further forward than ordinary, leaving more or less to the chest width, and reversely so to the back. Also the width diameter of arm may be less than proportionate, or in other words the outline of figure is less round and more elliptical or oval. The *depth through* is less, while the *width across* is more than it should be. But the quantity of variation may be considered as of **three degrees** (as in several examples which follow), and these will cover most cases. Thus, for backward arms: 1, ¼ in.; 2, ½ in.; 3, ¾ in. The same for forward arms.

Blades flat or prominent.—In the latter the base of triangular blade-bone projects, sometimes forming quite a deep "valley" between the prominences; often found with forward shoulder-head, or with depressed (low) shoulders, or with stooping attitude. Flat blades are found in erect figures, also in broad-chested, and with arms set back. The majority of ladies are of this type. Speaking generally, the position of base of blade-bone is inverse to that of top of shoulder (*i.e.*, the acromion); when the former is prominent the latter is forward, and *vice versâ*, the reason being of course that both points are different parts of one bone (see Round form). In some instances one blade-bone (frequently the right) is found much more projecting than the other. When this is so this type is in danger of being mistaken for hump back—an error that should be avoided, as the practical treatment needed is different in each case. The ordinary amount of round for blade-bone is five-eighths of an inch, therefore flatness or prominence means when less or more than five-eighths of an inch is taken up by the figure. When the back is flat it is a common thing to find hips and seat prominent, requiring more spring in the garment, whereas with round blades hips and seat are usually flat, less spring being required.

Broad chest.—This may arise from position of arms, extra pectoral development, or erect attitude. It must be associated with a flatter back than normal, and frequently a smaller arm diameter. In these cases the quantity to front of scye is less than proportionate. Well-formed women are of this type, and frequently corpulent men. For normal chest width, see Sections XII. and XIII. The three **degrees** of **variation** are: 1, ½ in.; 2, 1 in.; 3, 1½ in., reckoning from front of arm to front of arm.

Corpulent.—There are front corpulence, side corpulence, and general corpulence. Each term defines itself. A circumferencial measure only does not reveal the form, but the plan of dividing the figure into sections and measuring, or judging front and back from the side lines, may be put into practice actually, with the inch tape if needful, or *mentally*.

[That is, the practitioner should train his own mind to observe Form methodically, and the imaginary "mapping," as described elsewhere, will help him to do so.]

(See Corpulency, page 46.)

Extra-erect.—This is attitudinal; the figure bends backwards from hip-joint and waist; back balance and back surface become shortened, and front balance and front surface lengthened. However, such examples are sometimes found with a hollow back or forward front waist, and then the back balance may become longer again, because of the forwardness of the centre waist-point increasing the distance from nape of neck to this same point, which we remember is on the side or lateral line. As a person increases in corpulence he necessarily becomes more erect, but some are erect without corpulence. The balance measures rarely reveal more than one inch either way, generally less. **Degrees** of **variation** are less than its opposite—the Stooping form. Thus: 1, ¼ in.; 2, ½ in.; 3, ¾ in. in excess from normal.

Flat back.—Connected with Arms backward, or Flat blades, or Broad chest, or Erect attitude (which see respectively).

Flat bust.—(See below.)

Full bust.—This means that if two measures are taken, the one immediately over the bust and the other three or four inches above (the tape remaining the same at back), if the first is more than one inch in excess of second, then a full bust is revealed. The **normal excess** is therefore one inch. If more or less there is a full or a flat bust. An extra large bust is naturally accompanied with a comparative flatness round front of arm-hole, even in full figures. (See further on this under Form in Garment Making.) Flat bust is the reverse of above.

Full hips.—The proportion of size of hip is given elsewhere. In cases of full hips the latter exceed their proper quantity; often found in angular, large-framed undeveloped forms, and also in short stout women; less frequently in stout men, that is, in comparison with other dimensions. Hips are small when they do not measure the proportionate quantity. Girls, being undeveloped, are of this type. Full hips are often found in flat-backed forms.

Head forward.—Is distinguished from "stooping," as the attitude applies to that part of figure above the acromial or shoulder-head line, and this suggests where the extra length of back must be added. Often found among the aged, the sedentary and contemplative classes, and also among those of weak physical constitution. The extra length needed usually varies according to **two degrees**: 1, ¼ in.; 2, ½ in.

High shoulders.—The acromion is higher in respect to the nape of neck than three inches (the normal quantity). The section affected is height of neck or shoulder slope (see page 41). Nearly all variations, including the different sizes of forms, hover between three inches and two inches, and few reach this latter quantity within a quarter of an inch. High shoulders are found among stout forms (for reasons, see Sectional Development), the most pronounced in short and stout figures combined. Boys are often of this type. Practically the same as short neck. The **degrees** of **variation** are: 1, ¼ in. less than normal; 2, ⅝ in. less; 3, 1 in. less.

High stomach.—A well-known term among females indicating front prominence below the waist. It is sometimes natural, but more frequently results from tight lacing, a practice which forces the substance affected out of its proper place. In working for such figures an extra forward front is needed, which reckoning from any division of the waist measure itself will not give, whereas a division of the hip measure will, supposing both to be measured from the side or lateral line as usual. This type should not be confused with that of prominent hips.

Hollow waist.—Occurs when the waist recedes at the back more than two inches from its back framing line—the vertical line which touches the projections of back and seat. (See side view of Figure, page 34.) This is sometimes found when the form at waist region is more forward than usual, at others the waist itself is small. Some tailors are in the habit of describing a figure as hollow waisted, when in reality the dorsal part of back is round, and consequently becomes prominent. Of course in such a case the waist is hollow, but relatively, not actually. Waists are seldom more than three inches hollow, that is one inch extra from the normal.

Hump back.—This takes place when for some reason (sometimes from violence) the back-bone and breast-bone are diverted from their proper altitudinal growth, and form a projection back and front. It is as if some external force had crushed the head and shoulders downward, and consequently those bones which ought to have grown uprightly had been pushed outwards, hence hump back and pigeon breast are frequently found together; and also what the figure has gained in its deformed outward projections it has lost in height; hence tall men are rarely hump back. The amount of extra back length and width is variable—according in part to the age—two, three, and sometimes four inches beyond normal. The chest is suddenly projected like an elbow, and needs its deficient *upright* length added to its cross chest width and its *diverted* length.

Long-bodied and Short-bodied.—Generally the length of the trunk bears a very fair proportion to the height, but when the legs are shorter than they should be that proportion is upset. In short figures, therefore (below 5 ft. 3 in.), a little may be safely added to the body length (as for instance for natural waist length), from a quarter to three-quarters of an inch, very rarely more even for extreme cases. The reverse for short-bodied. This is worked out ready for practice in Rules.

Low shoulders and Long neck.—The acromion, or top of shoulder, is lower in respect to nape of neck than three inches, therefore height of neck section is longer than usual. This variation hovers between three and four inches, rarely reaching so much as four inches (compare High shoulders). This form is not identical with that of long-necked, but practically it may be treated the same. Long-necked means that the neck column itself is longer than usual, and ought to be met logically by a deeper collar. Short-necked is of course the reverse. **Degrees of variation:** 1, $\frac{1}{4}$ in. more than normal; 2, $\frac{5}{8}$ in. more; 3, 1 in. more.

Odd shoulders.—Frequently arise from an unequal exercise of corresponding sets of muscles. The right shoulder is mostly biggest, and if both shoulders are measured from nape round arm to nape again, the right-hand quantity will exceed the left-hand. Mechanics and hard-workers, also men of extreme sedentary habits, are prone to odd sides. **Degrees** of **variation :** 1, ½ in. excess; 2, 1 in. excess; 3, 1½ in. excess.

Round form.—This is often met with; it is the reverse of the angular. It has no sharp bones, prominences, or hollows, but has a rounded surface, especially in shoulders, back, &c. Found among stout, corpulent, fleshy men. Women are frequently of rounder form than men; their muscles are softer and their general surface more plump. As angular types can wear garments larger than breast measure indicates, so round types can often wear garments cut from a smaller scale.

Seat full or flat.—Occurs when seat exceeds or when it is less than the proportionate quantity as explained in this work. (See under Full hips).

Short neck.—Practically the same as High shoulders (which see), but anatomically it is not the same. The three **degrees** of **variation** are: 1, ¼ in. less than normal; 2, ½ inch less; 3, ¾ in. less.

Square shoulders.—When the line of shoulders is horizontal, or at right angles, or nearly so, with the centre back line, the figure is said to be square-shouldered. This type should not be confused with high shoulders. (See Angular figure and High shoulders.) The vertical diameter of arm may be the same; it is the height of neck section that is reduced.

Stooping.—The body bends forward from hip-joint. This type is often found with a rounded back, especially in dorsal, blade-bone, and shoulder region. From half an inch to one inch extra length will cover most cases. A comparatively contracted chest must be looked for in connection with a stooping form. Whatever measurements are taken, those passing over back and shoulder parts of figure and reaching to the front of scye will reveal this. The **degrees** of **variation** are: 1, ½ in. excess; 2, ⅞ in. excess; 3, 1¼ in. excess.

Thighs full or small.—Are so defined when circumference of each is more or less respectively than nine-sixteenths of seat measure. Of course, in tailoring it is neither necessary or possible to deal with minute quantities, but the practitioner bearing in mind proportion is better able to detect form. (See under Fork, page 48.)

SECTION XVI.

ATTITUDE.

Attitude is defined as the posture in which a person stands, or in which a human being or an animal is represented in painting or sculpture.

The erect position of the human body is maintained by muscular activity.

"The whole weight of the body rests on the arches of the feet, and the body may be supported in any position providing its centre of gravity is situated vertically over any point in the space enclosed by the feet. On account of the large number and suppleness of the joints, the centre of gravity cannot be maintained in such a position as described above without the contraction of certain muscles which give a degree of rigidity to the body."* It is not our function to teach anatomy, or we might speak of those muscles of the calf connecting with the thigh-bone which prevent the body from falling forward, and of those running along the spinal column, which also act in the same way; or of those opposing muscles situated in front of leg, of thigh, of abdomen, and of the neck, which all keep the body from falling backwards. In the process of balancing the action and counteraction of all these pulleys must be of the most extraordinarily rapid and effective character. Dealing with attitude from a technical point of view, we must regard it as normal when the lateral line shown on Fig. 9, page 34, is perpendicular. Any divergence from the vertical means so much change of attitude. Of course the body alters its posture chiefly by turning on the hip-joint; but in garments for the upper part of the body, it is convenient to deal with it sometimes from the natural waist (the three-eighth line on the figure), but generally from the bottom of arm-hole. From this station on Fig. 9, two faint lines are seen diverging from the side line in a forward direction, with their two corresponding square lines going towards the back. Thus, instead of the thoracial line being horizontal as for the normal attitude, it is tilted, and the back gains in length while the front loses. If an extra-erect posture were assumed, an opposite effect would result. In cases of head forward or head backward it is the acromial, or top of shoulder, that is thus tilted.

So far so good. But the chief difficulty met with is—How to ascertain the amount of declension, erectness, head forwardness, &c.

There are **three means** to be used, alone or in combination, as the circumstances permit:—

1. Observation.
2. Measurement.
3. Analogy.

Observation needs some amount of practice and training. It is assisted by the adoption of the methods explained in Section IX., page 28.

Measurement has also been largely dealt with (see Sections IX. to XIV., and the article on Measurement in relation to form).

By **Analogy** is meant an estimate of what the figure (judged by comparisons, &c.,) is likely to be.

It is convenient to consider changes of attitude as of **three degrees,** not that Form-growth can be limited to any exact quantities, but as a help to the judgment. This has been done under the Section Types of Form.

Owing to the difference of outline and form in the back and front of the figure, experience shows that the forepart of a body garment, such as a coat, bodice, jacket, &c., requires to be longer from a half to three-quarters of an inch than the back above the thoracial line. This may be considered as the **normal difference.** Special garments for the same figure need to be longer; for instance, dress coats and loose-fronted ladies' jackets, and this generally to twice the amount stated above. If a true horizontal line were drawn round a figure of normal attitude, such line of course being at front and back equi-distant from the floor, and then a back and front measure be taken, each from nape of neck to such a line, the excess of front length over that of the back would be about five inches. This would represent the front and back length of a garment. The quantity changes according to attitude. For **erect** figures the front length may gain one inch, for **corpulent and erect** as much as two inches, making in all seven inches difference. For stooping or head-forward figures the back gains to an extent somewhat similar, so that the relative difference is thereby reduced.

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* Elementary Physiology.

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PART III.—RULES.

FOR ASCERTAINING QUANTITIES (APPROXIMATELY) WHEN ACTUAL MEASUREMENTS ARE UNOBTAINABLE OR NOT TO BE RELIED ON.

SECTION XVII.

The List is in Alphabetical Order.

[Most of the matter dealt with here appears elsewhere with the text, but it is summarised as below for ready reference.]

Across chest.—Add breast measure and ordinary frock coat allowance, say 2¼ in. together, and deduct front of scye measure. Remainder is cross chest measure.

Arm.—(See Sleeve.)

Back width.—Add cross chest, and half front scye less 1 in. together; deduct their total from breast measure plus 2¼ inches (see under Across chest). Remainder is back width.

Calf.—(See Knee circumference.)

Chest.—For relation of this measure to other dimensions, as Seat, Waist, Shoulder, &c. (see under those terms).

Depth of scye.—(See Scye depth.)

Drop.—By this is meant the overlapping as in knickers, sailor blouses, ladies' sleeves, &c. Twice the amount required to drop must be given, half of this to show, and half to return underneath. For instance, if knickers are to show 2 in. below small, give total drop of 4 in.

Elbow.—(See Sleeve.)

Fork.—An explanation is given on page 48. Being necessarily a part of thigh diameter, it must be determined partly by that (see thigh). For corpulent figures, where seat is large and thighs disproportionately small, take the mean of 40 and actual seat measure to find fork.

Fork to small.—If leg measure is known, take half of it plus ½ in., as 31 leg $\div$ 2 = 15½ + ½ in. = 16.

Front of scye.—From breast measure and $2\frac{1}{4}$ in. (see Across chest) deduct the across chest measure. Remainder is front scye. Or take two-thirds of scale, whether of breast (for normal) or of shoulder measure.

Height of neck.—First find scye depth by taking the mean quantity between half natural waist length and half the working breast measure. For instance, natural waist 17, breast measure 18, which gives respectively $8\frac{1}{2}$ and 9, the mean being $8\frac{3}{4}$. From this deduct scye diameter, which is one-third of scye circumference; or, if the scye is not known, substitute one-third of scale, whether it be breast or shoulder measure, less one seam. As an alternative take half front scye less a seam, say $5\frac{3}{4}$ in. Remainder is height of neck, three inches.

Knee circumference.—As a useful suggestion, take three-eighths of complete seat measure. The measure round calf in a majority of forms closely follows this. No more exact rule can be given, especially for calf which changes considerably. (See Sectional Chart on page 40.)

Knee to fork.—(See under Small to fork.)

Leg length.—No infallible rule can be given, but the following will cover a large majority of cases: **Divide total height by two, and from the half quantity deduct two inches,** thus: 5 ft. 6 in. = 66 in. ÷ 2 = 33 − 2 in. = 31 leg seam.

[Note.—If the legs are disproportionately long, it is evident the trunk must be disproportionately short, therefore the sensible plan would be to add to the former what was wanting in the latter. This is, however, easier said than done. But suppose it be known that natural waist (as representing a part of the trunk) is half an inch shorter than it should be, it would then be safe to add this half inch to leg length.]

A like result, however, may be obtained by a much readier method. The principle of deducting the *fixed quantity* (two inches) from a *movable quantity* (half height) is sound, but the variation it produces is not enough for extreme cases of shortness and tallness. Therefore we suggest—

An alternative rule, which is based on the same principle. **Take nine-sixteenths of height and deduct six inches from it,** thus: Height 60 in., nine-sixteenths of which is $33\frac{3}{4}$; deduct 6 in. is $27\frac{3}{4}$ leg seam. Or, height 76 in., nine-sixteenths of which is $42\frac{3}{4}$, deduct 6 in. is $36\frac{3}{4}$ leg seam. If the two methods are compared, it will be found that for the short man we have a leg seam a quarter of an inch shorter in the alternative rule; and for the long man three-quarters of an inch longer. And this is a direct following of Nature reduced to simple intelligent practice.

It may be asked, respecting this and other examples,—If any rules of calculation be set forth, why not simplify them by giving a straightforward proportion only, instead of recommending the apparently more complex method of a proportion *less so-and-so?* The answer is plain. It is in thus using a fixed quantity in conjunction with a movable quantity that the required variations are obtained; for it is evident that if a known proportion was deducted, only a known proportion would remain; whereas the way suggested as above leaves a longer leg seam as the stature increases, and a shorter one as it decreases. We thus follow Nature more closely than by operating with a movable quantity merely. The same principle has been applied in other cases—for instance, in the rule for length of arm. In addition to the above two rules the writer has tried another, namely: **five-eighths of height, deduct ten inches**; but this seems to vary in excess of actual growth, except in extreme cases. He therefore prefers the second-mentioned rule. But he ventures to say that they are all suggestive, and that he has found No. 2 singularly correct.

Length of garments.—The Eight-head Divisional system can be safely applied to fixing the lengths of various garments, such as coats, &c. Our readers are supposed to be familiar with the divisional lines. Remember that the tailor deals with seven-eighths of the total height, also that three-eighths from nape of neck *plus one unit* reaches to fork, or where the legs begin.

Hence we get the following sub-rules—

1. *For coats to reach to fork.*— $\frac{3}{8}$ height and 1$\frac{1}{2}$ in.

(The inch is added for scientific reasons; the half inch to allow for surface measure.)

2. *For coats to reach to mid-thigh.*— $\frac{1}{2}$ height and $\frac{1}{2}$ in.
3. ,, ,, *above knee.*—$\frac{9}{16}$,, ,,
4. ,, ,, *below knee.*— $\frac{5}{8}$,, ,,
5. ,, ,, *mid-calf.*—$\frac{11}{16}$,, ,,
6. ,, ,, *bottom of calf.*— $\frac{3}{4}$,, ,,
7. ,, ,, *ankle.*—$\frac{13}{16}$,, ,,

The rule for determining the length of Vests is a simple one, based on a combination of length and width; thus, add together length of natural waist, five-twelfths of half breast, or of half waist (whichever happens to be largest), with making-up, say half an inch.

For	ordinary	figure,	36	Breast,	17	N. W.,	it will be	25 inches.
,,	short and stout	,,	44 46	,,	16$\frac{1}{2}$	,,	,,	26$\frac{3}{4}$,,
,,	tall and thin	,,	34	,,	18$\frac{1}{2}$	,,	,,	26 ,,

Minute fractions are not reckoned.

Mid-thigh.—This will be found near enough for all practical purposes at half-height from nape of neck, or one-eighth of height from fork. For close circumference take mean quantity of thigh and knee measures (which see). This will generally be a little less than half seat measure.

Natural Waist.—Reckon one-fourth of total height and a half inch. The half inch is added because it is a surface measure.

Neck.—For close garments half breast measure less one-eighth; for coats add to this $\frac{1}{2}$ in. aside, or 1 in. in all; for overcoats half breast.* The diameter of a normal neck is 5 in., giving a radius of 2$\frac{1}{2}$ in., which for close garments, such as clerical or military vests, would answer to length of *position* line of "West-End System." For looser styles, as coats, add $\frac{1}{2}$ in., which gives us the ordinary one-sixth of breast, as found in so many systems.

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* Compare the Shirt List in Part V.

Outside arms.—This dimension, used in cape cutting, ranges from 6 to 8 in. more than breast measure. This latter, added to one-sixth of itself, will be a reliable guide; thus, B. M. 38 added to $6\frac{3}{8}$ gives $44\frac{3}{8}$ for outside arms.

Rise of trousers (fork to waist, not including waistband).—This section properly includes one-eighth of height, one unit (or inch), and half inch for ease. But a simpler way to reckon it is one-third of leg measure and one-fourth of entire seat measure. This in trousers cutting supposes the operator works *upward* from fork line to fix his waist, which he certainly should do, instead of carelessly placing it two inches from top of trousers regardless of their height in body. Being also a combination of height and breadth, these two elements control one another.

Scye depth.—This being part length and part breadth may be found as explained under height of neck, that is, by a union of the two dimensions which affect it. The distinction of meaning between scye depth, which includes also height of neck, and scye diameter which excludes it, should be remembered.

Scye diameter.—One-third of scye circumference, or as explained under height of neck.

Seat measure.—Averages more than the breast, although it bears a relation to it; therefore, calculate breast measure and $\frac{1}{24}$ of the same, except in sizes over 40 breast. In these latter reckon from the mean of 40 and the actual breast measure, as 44 B., the mean of which and 40 is 42. Compare with our notes on Form-Growth in different Nationalities.

Sleeve.—Length of sleeve may be approximated in two ways, both of which are in accordance with what we know of Form-Growth. First, from height as follows:—Half height plus $\frac{3}{4}$ in., deduct 3 in., which for figure 5ft. 6 in. would give $30\frac{3}{4}$ sleeve. Second, take natural waist less 4 in., add back width to the acromion and ulna length, which for 5 ft. 6 in. would give $17 - 4 = 13 + 7\frac{1}{4} + 10 = 30\frac{1}{4}$.*

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* The former of these Rules, although very simple, has been carefully worked out and extensively compared with actual measurements. It is based on the following facts: with arms outstretched from tip of middle finger to tip of middle finger, in most cases, amounts to one and a half inches more than total height, hence the three-quarters of an inch added. A *fixed* quantity, *seven inches*, is deducted for length of hand, to which *four inches* is afterwards added for angle allowance, leaving three inches only subtracted. It may, therefore, be further simplified by saying, **half height less $2\frac{1}{4}$ inches.** The dimension is to the wrist or carpal bone, and takes no notice of variation for fashion or individual taste. It will be found that a *fixed quantity* used in conjunction with a proportional quantity leaves a longer arm for the tall figure, and a shorter one for the diminuted one, as already explained when dealing with leg length.

Shoulder measure as scale.—For stout figures over 40 breast take mean quantity of 40 and actual measure for working scale. This measure can be utilized for both vertical and lateral diameters of arm-hole, and some systems use it for regulating the length of shoulder. (Compare what is said under Front of scye, Height of neck, and Shoulder measure, and Front of scye for ladies.)

Tall and slender figures.—These require garments cut generally larger than a scale obtained from their breast measure would give. A nominal scale may be obtained thus: find proportionate breast measure for total height, and take the mean of this and actual chest. Of course this must be regarded as approximate and not exact measurements. Real measurements are always preferable, if to be obtained, and if reliably taken.

Small to fork.—Half leg measure plus ½ in. **Centre of Knee-cap** will average 3 in. above at leg seam, and 2½ at side seam, and prominence of **calf** 3 in. below; bottom of calf one-sixteenth of height lower still.

Spring of skirt.—Consider lateral line your dividing point (this may be continued down from front of scye). Give a *small* half in advance for front of garment, and two-thirds, which will include seams and ease, for the back; for ladies give a *large* half in front and two-thirds at back, or according to number of seams and looseness, &c., required.

Thigh (close, that is, not to fashion size).—The circumferences of both thighs must bear a relation to the seat. The relation is this: each thigh measure equals half seat and one-sixteenth. Their two circumferences, therefore, are equivalent to seat measure and one-eighth of same. About one-third of thigh measure is required for nett fork, and about 1 or 1½ in. beyond that for ease.

Waist.—This is a variable quantity; no rule can be given. Tailors have reckoned that in the ideal figure waist should be one-sixth of breast less than breast. In England, however, such forms are not usual. A more useful average is to use one-eighth instead of one-sixth. A specially prepared Table calculated on this basis will be found in Part V.

Waist distribution.—Generally half the amount goes to the back of lateral line (which is vertically below front of scye) and half to the front. Practically this varies but little from Wampen's method of two-thirds in front (see under Corpulence, page 46), giving more at sides and less in front. Figures vary, therefore methods of application must vary.

SIMILAR RULES APPLIED TO THE FEMALE FIGURE.

[The Rules for men are, generally speaking, applicable to women. The following list should be considered as supplementary and exceptional.]

Across chest.—Several costumers have recommended the plan of checking the full breast measure with one taken across chest, front of arm to front of arm, and another taken across back from and to the same points. The two latter quantities should balance full breast. (For further particulars see former Rules for men.)

Breast and waist.—In men the ideal or proportionate waist equals five-sixths of the breast, whereas in developed females it equals two-thirds of breast. Therefore—

A. *To find proportionate waist*, deduct one-third of breast from itself; thus, $36 - 12 = 24$, which is the required quantity.

B. *To find proportionate breast* from waist, add to waist half of itself; thus, $24 + 12 = 36$, which is the required quantity.

C. *Breast and waist relation in large figures.* In forms over 36 breast the proportion of one-third, as set forth above, is seldom, or at any rate much less frequently, found. A more correct average is as follows: when over 36 breast deduct one-third as usual, and add the mean quantity between the actual breast and 36 to the result. Thus, $40 - \frac{1}{3} = 27\frac{3}{4}$ + mean 2 in. = $29\frac{3}{4}$. Again, $43 - \frac{1}{3} = 28\frac{2}{3}$ + mean $2\frac{1}{2}$ in. = $31\frac{1}{4}$ nearly.

D. *Breast and waist relation in small figures.* In undeveloped girls under 33 breast deduct one-third as usual, and add the whole quantity between actual breast and 33. Thus, for girls, 27 B. $- \frac{1}{3} = 18 +$ difference 5 in. = 23 waist; or, 24 B. $- \frac{1}{3} = 16 + 9 = 25$ waist.

Bust measure.—When breast and bust are both taken, the first above the *mammilæ*, the second immediately over them, they are useful **form-tellers.** Their difference indicates prominence of bosom. The normal difference is one inch. In such a method the tape should remain unmoved at the back of model, being simply moved downward in front.

Front of scye.—Owing to the peculiarities of the female form, this important point must be fixed according to some other rule than that applicable to men. We submit two plans, independently obtained, both reliable, and which happily confirm each other fairly well.

First plan.—Find front of scye from two-thirds of shoulder measure scale. To find an average shoulder measure, begin with 33 breast; for sizes above this use the mean quantity of 33 and actual breast measure. For instance, for 36 breast the mean of this and 33 is $34\frac{1}{2}$, which gives $11\frac{1}{4}$ for front of scye; or 42 breast, the mean of this and 33 is $37\frac{1}{2}$, which yields $18\frac{3}{4}$ scale, or $12\frac{1}{2}$ front of scye.

Second plan.—For front of scye take half breast and *two inches* for all sizes. Now here we have another illustration of the inter-working of a *movable* with a *fixed* quantity. Again taking 36 breast, as in the last instance, by way of comparison, we get 18 for scale, which gives us 9 and 2 in., or 11 in. front of scye. Or 42 breast, we get 21 in. for scale, which gives us $10\frac{1}{2}$ and 2 in., or $12\frac{1}{2}$ in., for front of scye, and so on. Both plans give a flatness to the shoulder and back portion of garment and a preponderance to the bust region. But it will be noticed that the breast measure method is applicable also to girls' sizes. For instance: 28 breast gives 14; 7 and 2 in. equal 9 in. for front of scye, which is nearly equal to the breast measure. 24 breast gives 12; 6 and 2 in. equal 8 in. for front of scye, which is quite equal to the breast measure.

EXTRA RULE FOR OBTAINING A SCALE FOR FULL-BUSTED, THIN-WAISTED FIGURES.

In cases where waist is smaller than normal (that is, than two-thirds of breast) deduct the *excess of disproportion* from the proportionate scale, which thereby puts the material into front of garment. Thus: for 33 B., 20 W.; the excess is two inches, which, taken from 33, gives 31 for scale, or $15\frac{1}{2}$ instead of $16\frac{1}{2}$.

Hip measure.—Which being taken about seven inches below waist will equally answer to seat measure.

A. *To find proportionate hip from breast.*—Add to breast one-sixth of itself; thus, 36 B.M. + $\frac{1}{6}$ = 42.

B. *To find hip measure for short and stout forms.* When under-arm length is less than seven inches, and breast over 37, or thereabout, the hips generally become larger in proportion. The rule is, add to breast one-fifth of itself; thus, 40 + $\frac{1}{5}$ = 48, which shows an excess of $1\frac{5}{8}$ beyond the average proportion.

C. *To find hip measure for tall and slender forms.* When under-arm length exceeds 8 in. and breast is less than 33, the hips generally become smaller in proportion. The rule is, add to breast one-seventh of itself; thus, $31\frac{1}{2} + \frac{1}{7} = 36$, which yields three-quarters of an inch less than average proportion.

All these rules follow nature pretty closely.

In cases of "high stomach," which sometimes belong to young ladies owing to tight lacing, &c., as well as to matrons, it is a good plan to determine the front of waist by the hip measure instead of by the waist measure.

Natural waist length.—This, as in men, averages one-fourth total height plus a quarter of an inch, but in practice this rule is lessened in value, inasmuch as fashion dictates very largely the waist length at back. The same variation is not possible, however, with respect to its dependent length, namely, under-arm measure (which see).

Neck.—It has been frequently said that a perfect feminine form should have a neck half the size of waist. This standard, however, supposes both measurements taken on the undraped model. The waist is too changeable a quantity from which to estimate size of neck, while the breast is for other reasons also objectionable. The rule here given will overcome the difficulty in a manner both ready and simple.

A. To find neck size take $\frac{7}{8}$ of half breast for sizes up to 33.

B. For figures above 33 take also from half breast an additional $\frac{1}{8}$ in. for every size, thus—

17 − $\frac{1}{8}$ of 17 and an additional $\frac{1}{8}$ in. = $14\frac{3}{4}$.
Or, 21 − $\frac{1}{8}$ of 21 ,, ,, $\frac{5}{8}$ in. = $17\frac{3}{4}$.

Nipples.—Their natural place is midway from front of arm to centre of front, therefore one-fourth cross bust measure, or what is nearly equivalent, one-fourth of half breast, will fix their lateral position. The lateral line passes through the nipples. Lengthways they are about three inches below a horizontal line from arm-pit. The amount of provision required may be ascertained somewhat in this way: compare half cross-chest or bust width with one-fourth tight waist *less one inch.* The difference is the provision wanted, or quantity for darts. Thus, X B., $8\frac{1}{2}$; $\frac{1}{4}$ W. less 1 in., 5; difference $3\frac{1}{2}$ in.

Sleeve.—Half height plus $\frac{3}{4}$ in.; deduct 3 in. In the alternative plan the back width must be to the acromion or true head of shoulder, and not the fluctuating fashion width (see these two plans explained on page 60, under *Sleeves*.

Shoulder measure.—The best way to use this is as a supplementary one to the breast measure, and as a scale for determining certain shoulder sections. A rule for finding shoulder measure will be found under "Front of scye."

Spring of skirt.—(See page 61.)

Under-arm.—In the normal size it is half natural waist length and about a quarter of an inch. Thus, 15 N.W. gives $7\frac{1}{2}$ and $\frac{1}{4}$ in. $= 7\frac{3}{4}$. But it is evident that girth affects this under-arm quantity. Therefore proceed thus:—

A. For slender figures under 34 bust, to the result as explained above, *add* quarter of an inch for every inch that the breast measure is less than 34. Thus, 32 B., $15\frac{1}{2}$ N.W., gives $7\frac{3}{4}$ and $\frac{1}{4}$ in. $= 8$; add $\frac{1}{2}$ in. for difference of size round, which yields for under-arm $8\frac{1}{2}$ in.

B. For short figures over 34 bust proceed as above, except *deduct* quarter of an inch for every inch of difference in size round. Thus, 35 B., $14\frac{1}{2}$ N. W., gives $7\frac{1}{4}$ and $\frac{1}{4}$ in. $= 7\frac{1}{2}$; subtract $\frac{1}{4}$ in. for difference of size round, which yields for under-arm $7\frac{1}{4}$ in.

Waist.—(See under Breast and waist.)

PART IV.

FORM IN GARMENT MAKING.

We have hitherto been engaged in considering some of the principles on which the production of garments is based, or, in other words, on the *science* of cutting. But garment making is an art as well as a science. Besides its useful character dress is a decoration of the figure; consequently, however elaborate or peculiar it may be, it should never descend to a disfigurement. As a frame to a picture so is dress to the body. Though sometimes its office is to conceal defects, or supply deficiencies, its main business is to "set off" the form, and enhance its attractiveness. At the present time the old honest sewing formerly so common is almost a thing of the past; but *form*, shape, and style are necessities almost absolute. Various are the means employed for obtaining them. Among such are:

1. Arrangement of seams (including their number and placing).
2. Choice of material.
3. Trimming.
4. Shrinking, stretching, wadding, or building up.
5. Shaping.
6. Trimming or garniture.

A good illustration of the above will be found in Military tailoring. Several distinctive features mark this branch, but perhaps the most prominent is this display of form. If a smart manly figure is not the natural possession of the soldier, it must be artificially produced for him. Trousers cut rather narrow and short body garments, which show the lower limbs, give appearance of height. As an instance of the latter take a shell, or patrol jacket, or a tunic. Absence of a back seam presupposes a flat back, while the broad wadded front and close-fitting stand collar give a widened expansive chest and shoulder surface. Both seams and trimming are so arranged that an appearance of manly power is lent to the upper part of the figure, both tapering gently to the waist. Shoulder ornaments, such as epaulettes, straps, or cords, are evidently not for ornamentation only, but serve to give breadth and squareness to the shoulders. His jacket, tunic, or frock coat must fit closely at waist, and his trousers or breeches must be without superfluous material in the seat, otherwise smartness will be sacrificed for an air of slovenliness. His arm-hole must be well cut, closely fitting, yet with all necessary freedom for varied movements, while his chief decoration he carries in front, suggestive of his forward attitude when in action.

It may be said that uniform is not the same as mufti, and that the rules which apply to the first are out of place in the case of the second. But this is only partly true. Form and style are demanded in private clothing as well as in uniform, but greater comfort and conventionality are needed also. In order to produce them, the ideal figure must in some sense be present in the mind of both cutter and operator. The broadened chest, giving free action for respiration; shoulders just squared enough to copy Nature in her best mood; a neck which grips the figure, keeping the garment from dropping on the one hand, or forming creases on the other; a breast carefully worked up; a well-controlled edge, whose curved outline pleases the eye; a turn and collar agreeable to current fashion and to the style of garment, and also in harmony with each other; side seams gracefully curved; shoulder seams well placed; waist seam slightly rounded; pleat and hip moderated by art according to the requirements of the model—all this exists in projection with the tailor-artist before it is actually produced. True, he cannot always realise his ideal, but he aims at it, and sometimes he reaches it.

And now for some of the ways and means that he employs.

I.—ARRANGEMENT OF SEAMS.

In arrangement of seams are included their *number* and their *placing*. Seams in a garment answer to **lines in a picture.** They may gratify, or offend, or deceive the eye. A curved line is generally more pleasing than a straight one. A lengthened line gives an appearance of height; several such lines accentuate the idea of height. Converging lines evenly placed show a proportionate diminishment; those that diverge convey an impression of enlargement. Horizontal lines suggest breadth and shortness, while lines in general break up a surface and give to it a form which frequently it does not possess. Curves look better than angles, although the latter have their place and purpose. Apply these simple truths to seams, and we have at once one means suggested for producing form artificially.

Now it must be evident that in men's attire, as at present worn, the tailor-artist is extremely limited. The scope for his taste and ingenuity is too small for its free display, but in women's clothing the same cannot be said. Something, however, can be done in the former field. The shoulder seam may be placed high and the back widened. Side seams lengthened for a short stout figure, or shortened and more separated for a long thin one. The width of back and side body can be increased or reduced according as more or less width needs displaying. The run of waist seam may be curved or straightened for a like purpose; and for thick dumpy figures, such garments as whole back lounges or Chesterfields can be discountenanced. The latter, having no seams or lines to break up the increased surface, are unsuitable for such men, especially those who may possess good taste. The same may be said of double-breasted reefers. For corpulent men, morning coats and lounges should not be cut off too much in front, as thereby the disproportion is brought more into view; nor should they as a rule be too straight, as in such a case there is a mass of unsupported material below the prominence. Length of garments must also be remembered. To give **length-appearance** the lower limbs should not be hidden, but as much as convenient may be displayed. A narrowed elongated roll and collar will sometimes help in this particular. If width is required, something of an opposite character must be introduced. Tall, slender men often look well in whole-back jackets and overcoats, in loose sleeves and trousers, and heavy turns and collars. A dress coat with its many lines is suitable to a bulky form, whereas a frock coat, owing to its fuller front and copious skirt, is shown at its best on a medium or slender model. In ladies' dress the same principles obtain but in greater degree, owing to women's higher taste and more devoted attention to every detail in the matter of attire.

"The modern bodice," says a recent writer, "exacts from its maker a degree of skill in cutting and manipulation in making probably never before required for any style of garment worn by woman. It must enhance every beautiful line and graceful curve of the figure by well-placed seams, and be close-fitting at all parts, without being tight enough anywhere to interfere with entire freedom of movement in every direction; it must cling to the figure like a well-cut glove, not only fitting it perfectly when in repose, but following every movement almost as the skin does; yet there must not be any appearance of undue closeness or strain to offend the eye, nor must there be any restraint upon the free action of the organs of respiration." *

In the choice of seams for ladies' body garments there is more latitude than in coats for men. The number of seams in the former range from *thirteen* to *two*, thus—

With	back seam,	three side-pieces,	and	two darts,	we have	thirteen.
,,	,,	two	,,	,,	,,	eleven.
,,	,,	one	,,	,,	,,	nine.
,,	,,	one	,,	one	,,	seven.
,,	seamless back,	one	,,	,,	,,	six.
,,	,,	no	,,	,,	,,	four.
,,	,,	stretched bodice, with fastening under arm, or loose jackets, coaching coats, &c.,				two.

Add to the above the various seams in skirts, those of horizontal form in waist, or basque, or yokes, &c., &c., and it will be seen that **form-appearance** can be considerably modified by **seam-arrangement.** Lines, curves, points, lengths, and styles of a garment as befitting each individual figure, are some of the means by which the skilful costumer gives grace to his or her model.

II.—MATERIAL.

Another important element for producing effect is by a suitable choice of **material** and **trimming.** Striped goods, as supplying perpendicular lines, give length. Materials with horizontal lines have a stunted ungraceful effect, and accordingly are seldom made. Checks, if small, are neutral; if large and conspicuous, they reduce height and add width; hence they are best seen on tall commanding forms. Black diminishes size, hence it is favoured by stout people; white enlarges. Dark persons may require a contrast in colour, and generally those of sallow complexion want relieving with cheerful bright shades. The fair and florid may correctly choose fawns, blues, greys, and browns. The short and stout, when not wearing black, should be attired in patterns of moderate, sober and reductive type. Red is the most conspicuous colour we have; it therefore looks too glaring on large figures, but with girls and children it is a favourite.

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* "The Elements of Modern Dressmaking," by Jeanette E. Davis. Cassell & Co.

Besides pattern and colour, the **substance** of material must have some influence on form-appearance. This, however, is so evident to every thinking person that it is unnecessary to dwell upon it. Goods that are thick and bulky are, as a rule, more suitable to forms that are the reverse; tall and spare figures need additional substance in their clothing to complement Nature's deficiencies; whereas the stout and corpulent both prefer and need materials that are thin and ventilating.

In the case of boys and girls whose forms are undeveloped, a loose or simple style of garment is usually preferred. Such are blouses, Norfolks, tunics, pouch bodices, bodices with gathered fronts, jackets straight-hanging, semi-fitting and with few seams. Large conspicuous patterns are unsuitable.

III.—TRIMMING.

Another constituent in the building up of form is that of trimming, under which head is included all kinds of accessories, such as *revers*, flounces, epaulettes, frills, *bretelles*, bands, pleatings, facings, cuffs, straps, insertions, puffings, &c., with all the various ingenious means known to *modistes*. By their use or absence, their position and direction, considerable changes are made in the appearance. For some time past a prominent effect of ladies' attire has been to give breadth and height to the shoulders, so that though modern waists are, we are often told, larger than formerly, they are made by contrast to look quite as diminutive. The art of trimming is an important one. It is best studied in following the track of contemporary fashion, for doing which there are abundant facilities now offered by the great variety of fashion journals (ladies' and gentlemen's), and by comparing effects on the living models. In directing attention to this branch of form-culture our work is so far done, as this book is necessarily somewhat rigid and permanent, whereas it is of the essence of fashion to be fresh and up to date.

IV.—STRETCHING, SHRINKING, AND WADDING.

The idea in dress being to set off a figure which is already perfect, or to make up the deficiencies in an imperfect one, the material must in each case be worked up accordingly. This work of adaptation is the very branch of the art of dress, which (at any rate at the present time) cannot be done by machinery. To do it satisfactorily taste, experience, and application are needed in a very high degree. The human body has no sharp angles. Its surface partakes of hollows and prominences—a natural series of hills and valleys so to speak. The general rule is:

> Stretching near the hollows;
> Shrinking and drawing in near the prominences.

Notice the word *near*, not *at;* for it is evident that the operation of stretching near a hollow is to leave the surface opposite to it comparatively short. So, in a reverse way, with shrinking.

The chief natural hollows are:

1. **Front of shoulder,** between shoulder-head-bone and collar-bone.
2. **Front of arm,** running from below shoulder-head prominence round front of scye. [This varies according to figure, and is more pronounced in developed females than in men owing to the formation of bust.]
3. **Waist.** This belongs to both sexes, but is far more defined in women. It is an important hollow.
4. **Between the Busts.** Although this is a very real and important hollow, for respiratory and other reasons, it is not practically dealt with in the ordinary manner.
5. **Between or near blade-bones** (see below).

The chief prominences are:

1. **Shoulder-head.**
2. **Ridge of collar-bone,** in spare figures often conspicuous.
3. **Bust.** Very pronounced in women, but being found in the respiratory region is doubly important.
4. **Hip.**
5. **Gluteal region, or seat.**

To provide for these peculiarities various means are employed.

TREATMENT OF SHOULDER.

FIG. 17.—Here the letter **H** shows hollows and the letter **P** prominences. The plain lines indicate places for shrinking (being opposite the risings of figure). Curved lines indicate places for stretching, or at any rate, where the material should be slightly full. Of course, such a system of manipulation needs to be adapted for each figure. Suppose, for instance, we have a figure having front corpulence, the prominence will then be in waist region while chest will be comparatively flat, so that the shortening will be needed at C C instead of H above, leaving the cloth of a convex form in the space marked by waved lines. But though this is so, there are nevertheless averages of forms, and consequent rules of treatment which are correct in a general way. Most figures require some working up of shoulders in order to give that appearance of manhood, mention of

which has already been made. The following ideas are gathered from methods adopted in various first-class shops:

SQUARE-SHOULDERED COATS.

FIG. 17.—No amount of building up at points of shoulders can be satisfactory unless the garment is also made hollow near the gorge as at H. Indeed, all extremes as to the former have become discredited. A better result can be obtained by stretching and a very moderate amount of padding. The gorge and shoulder head at P¹ P² may be stretched about half an inch. Some firms, however, prefer a similar operation at shoulder seam just above H, occasionally as much as one inch, and a like quantity taken off at shoulder scye point. This throws length over the acromial region without any further extension at that point. It should be noted that just above this (P² in Dia.) there is a short straight line. It reminds us that here, instead of stretching, the material must be kept in, especially in figures of the *round* type; some firms have a stay of linen or silk sewn in seam at this part. This keeping in will apply to the back pitch also. The canvas must agree in form with its forepart. This may be done by well stretching, as described above, for outside, or preferably by an inch puff inserted at shoulder seam in the canvas. Ease must also be allowed in the lining with a puff in front of arm or just over the bony head of shoulder. The padding should be soft, but firm enough to give substance. Sometimes this consists of pieces of soft bulky cloth welded together, thinned off at their inner edges, and not reaching to the hollow. In cases that require firmer building, a crescent pad made of wadding and horsehair, cloth, or canvas, is frequently introduced. Horsehair, cut to follow shape of forepart, pared just away from scye and frequently brought right to the front edge, is also used. It must be bound round its edges and cut away from button-holes. The run of outside shoulder seam is generally preferred as slightly hollow near the gorge, a little rounded over shoulder, and kept steady at its edge, as described above.

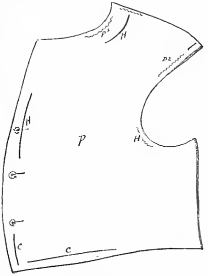

FIG. 17.

Of all garments requiring good shape and form perhaps the dress coat exceeds any. The following rules are carried out by some reliable tailors: A puff, as described above, is put in both canvas and lining in order to produce a hollow gorge. The silk facings are brought to about the centre of shoulder and are joined to the body linings; a puff is inserted at the crown of shoulder and another at front of scye. A **V** is taken out of pleat pockets at the hips, and the pockets themselves are cut large to reach the edge of skirt. A firmness and evenness are given to the entire front of armhole by a thin layer of wadding or domette (or both, according to special requirements of figure), reaching from shoulder seam right round to side seam at back, and attaching to silk facing in front. A pleat is formed in, or a **V** taken from, the breast facing below the rise of chest.

TREATMENT OF FOREPART.

Besides the working up of shoulders there are several details to be attended to in the forepart of a coat in order to give it "form."

Front edge.—It must be borne in mind that the prominence of breast is not in the centre of the front of figure, but is passed over by the mammaral line (see Fig. 13, page 43); the centre line B C, therefore, represents a flatter surface, and accordingly is itself shorter than a line passing over the bust. When a round is cut on the front edge of a frock or dress coat, it is intended that this extra width and length shall be pressed back into the place of the breast until this curved edge has become a straight. The same also in the case of ladies' bodices, &c., when such are similarly cut. Not only so, but the warp of the canvas should follow this straightened edge. This leaves a fulness at back of breast at the opposite edge of canvas, which should be taken away in two or three **V**'s. Connected with this is the working in of front edge, and the making and putting in of facing. Sometimes the breast pocket interferes with a proper adjustment of facing. The garment having to cover a convex figure it is evident that its inner portion should be less than its outer, so also must the front of breast pocket be a little tighter than its back. Indeed, this thought of *convexity* must be continually present with the operator. If a facing be put in the same size as its outside when on the figure it will probably show a tendency to curl outwards. It not infrequently happens that one forepart of a coat when finished shows a strong inclination to turn inwards, while its corresponding forepart rolls outwards, and this in cases when the garment has been produced by one individual. It sometimes arises from one facing being put in somewhat longer than the outside as well as wider; at others it is the result of a careless habit of handling the reverse foreparts. Another point is **evenness of surface.** A good coat maker avoids extremes of thickness, and often softens down irregularities by means of a thin padding, which is fastened flush with the cloth facing to level its surface, or with a careful arrangement of wadding and quilting. For a very stout figure *thinness* generally is required, for two reasons: to avoid any exaggeration of bulk, and for ease and lightness of wear. Such persons are given to perspiring freely, and are usually very sensitive, hence the necessity for comfort and lightness. Another point is **harmony** in the run of collar and turn. Men of taste seem to prefer a fairly long collar with a step well down on the breast. A coat collar should never be shorter than the size round neck, but it may be longer, especially if there is to be a low turn to the garment. The drawing-in part of collar seam looks uniform when parallel with edge of collar. **Position of buttons** is another item. If breadth appearance of chest is wanted let them taper slightly to waist. If, for instance, in a thin form an idea of width is required, set buttons widely apart; for a stout bulky form let them be set nearer.

FORM IN LADIES' GARMENT MAKING.

In addition to what has already been advanced in this section, a few more particulars as to the preservation and improvement of Form in the case of ladies' garments may be acceptable.

Wadding.—Its location and amount will depend on each individual figure and somewhat on the material used. It is a good plan to mark wadding lines on the cut-out model as well as to give verbal instructions. Most cases will require wadding in the neck hollow. The space begins about one inch below shoulder seam (supposing this is placed as usual) extending from two to two and a half inches wide, and continued round front of arm about two or three inches wide. For ordinary forms one ply is generally sufficient, but for **spare persons** the neck hollow may demand twice or three times that quantity. If bust is undeveloped, a little wadding placed under the canvas, or in the case of a dress bodice under the lining, may be placed at top of breast darts. Wadding, like padding, must be thinned nicely at its edges, each succeeding layer being cut smaller than its foundation piece. This is specially in thin dress fabrics, where any sudden break or diminution of thickness is liable to show from outside. **Full forms** may not require any filling up in shoulder, but such will probably need extra attention at front of arm-hole, where the rise of bust merges to a comparative hollow. This recession or fall, as it may be termed, is frequently a difficulty with even experienced tailors and dressmakers, owing to the decrease of *length* required, and this difficulty is accentuated where extreme stoutness and shortness of stature are combined. In such cases a large back dart is of great assistance, as it has the effect of shortening the very part referred to, and also of throwing extra length and width where both are wanted, namely, at the bust. This is a plan freely adopted in France, and of late has become more common in England.

In loose woven materials it is usual to cover the wadding with the same stuff to prevent its working through; and in washing stuffs it is made as a removable pad in sarsanet, and sewn in when the bodice is otherwise finished.

All ladies' tailors know the importance of avoiding any narrowness or sense of contraction in the chest, and as this liability has some connection with wadding, we will again quote from Miss Davis' Handbook:* "That the use of wadding in dress bodices is to fill up the natural hollows of the figure is not well understood, and many avoid its use altogether under the impression that it is the first step down the path where truth ends and falsehood begins. This, however, is not the case. The wadding has a definite office, and, rightly used, it is infinitely preferable to the wrinkles that will certainly form down from the shoulder unless the bodice is made uncomfortably narrow in the chest, which is bad equally for health and appearance. Manipulation of the material alone, which can be resorted to for all other hollows, must be cautiously used down the front of the shoulder, or it will seriously interfere with the organs of respiration by contracting the chest, in addition to drawing the figure over and establishing a habit of stooping. **The chest, therefore, should be allowed free scope.**"

Another point to bear in mind is the difference of treatment required in wadding the curves of the body, whether they are inward or outward curves. When dealing with an inward curve or hollow, it is evident that the largest layers of wadding or other filling-up stuff must be put nearest the *inside*, and the smaller pieces (carefully graded) nearest the *outside* material; or in other words, the longest layer first. When dealing with convex curves, it is the smallest layer comes first, and each succeeding ply should be longer; thus each hollow gets filled up according to its requirement. So with putting in linings. Wherever the material is stretched, as over the prominences, the lining should be put in easy, or it will contract and thereby nullify the straining.

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* "Elements of Modern Dressmaking."

In bodices and jackets Form is produced partly in cutting, partly in making. In seaming up, or placing the pieces together, the back, as a rule, is put in plain, care being taken not to stretch the side seam, which, being on the bias, is very liable to be done. Working up of bust and shaping waist hollow are important points; both must depend somewhat on the size, shape, and position of dart or darts. Some cutters prefer a cut placed immediately under the prominence, others choose to put one further back. If the former is done less manipulation is needed with the upper part of front edge, or the crease edge if the garment has an open front. A frequent practice now is (when there is a turn to hide it) to introduce a cut, its length to vary according to the figure and to the particular result desired, running about an inch backward from the neck-curve. The neck hollow is thus affected and a beautiful roundness is given to the chest region below.

Another item, considered of moment by journeymen who work on ladies' garments, is to avoid shrinking in front of scye (as between A and C, Fig. 12, page 42), also to avoid taking out a **V**, as has sometimes been tried. The effect of either is to throw an objectionable fulness just in front; indeed, some operators advocate a slight stretching when sleeve is put in. In jackets, &c., when from thin cloths, the canvas is often sewn in with the sleeve round top of shoulder-head (as at B, Fig. 12, page 42).

In dealing with full **matronly figures** both thought and care are needed. We may expect such forms to be large in the shoulders, with short back and comparatively long in front shoulder, short at under-arm seam, full hips, and less hollow in front than young persons usually are. Besides other provisions, they require the front line of bodice or jacket well advanced (see page 52, High stomach) to avoid the horizontal creases which are likely to form in the region of breast-darts and front edge, and in the lining only a little cross-cut or **V** is often put in from bust to front edge. When the figure is of the *spreading bust* type, the garment needs extra building up. This is done by boning and wadding. The bones are extended as high as convenient; what hollows there may be are filled up, and care must be taken to see that the chest width is sufficient. "Take care of the chest of your garment, the back will take care of itself" is certainly only a half truth, but it contains wholesome advice.

Another important element in the art of Form-building is **boning**. Much might be said upon this point but it scarcely lays in our province, and it is less necessary for us to deal with it, because already there are several well-written dressmaking books which treat of this very thing. To such we refer our readers, assuring them that those who sometimes leave the beaten tracks of tailor-literature and seek information in the world of feminine fashion, will constantly meet with fresh ingenious ideas that may be utilized in their own practice.

There is no doubt that the large amount of ladies' garment making now practised amongst tailors has greatly quickened their ingenuity, extended their resource, and improved their taste. They have found in it a liberty which the stereotyped style of men's fashions failed to give them. But whether it be he who cuts or he who shapes and sews, each realizes the necessity of taking diligent notice of the outlines, developments, and peculiarities of Form, and aspirants to a like success must also do the same.

SECTION XVIII.

MEASUREMENT IN RELATION TO FORM.

To a person unacquainted with the tailoring or dressmaking businesses few operations appear more simple than that of measurement. Nor does such an estimate of it indicate any deficiency in ordinary intelligence. The author at one period of his life was frequently brought into contact with gentlemen engineers—men of first-class ability in their profession. In conversation with them he was sometimes struck with the fact that, though well skilled in the matter of quantities, mensuration, divisions, &c., they had no idea at all of the difficulty in measuring the human form. Their view of measurement was strictly a mechanical one. A tailor, like a carpenter or an engineer's fitter, took a certain dimension on a certain body, and proceeded to fashion his material, whatever it might be, exactly to that dimension. If he was careful to do this and, at the same time, to carry out all other instructions given him, all would be well. A garment wanting in either fit or style was to them the result of carelessness or something worse. Consequently their estimate of the tailor's profession was not quite so lofty as some who write in our trade journals could desire. These engineers were not unique in their view. They were typical of the general public, or that part of it that stands outside the tailoring world.

We venture to say that in the whole area of trade few men have given more attention, thought, and even anxiety, to the practical part of their business than tailors and cutters—a diligence and an application which in many branches of life would have secured them a much greater share of esteem and reward than that which they ordinarily enjoy. But though socially the tailor has not stood very high, nor been regarded as a clever man, yet he himself has known perfectly well that his business was no easy task; it required all his patience and all his resource.

But what makes exact measurement difficult? The reason is found in the nature and peculiarities of the model, and not in the stupidity of the measurer.

The human form is a thing of life, of sensitiveness, of restless activity. No rules common to mechanics are altogether applicable to it. It stands alone. Think for a moment that it is possible for a person at will to make four and sometimes five inches difference in his chest measure; three or four inches in the length of his arm by changing its angular position; that his attitude is continually changing; that his shoulders are subject to all kinds of movements. That the body is extremely irregular; has no sharp angles; no place to fix a tape; is often sensitive to touch. And further, that the tailor has no such advantage as the anatomist, surgeon or biologist who leisurely measures the nude, sometimes with the aid of compasses and *even then finds it no such easy task*. Then again many men are careless in their habits of dress. Their clothes may be thin or thick, loose or close-fitting, too large or too small. Add to this differences of taste, idea, and many other details known only to the man of practice, and it is not difficult to understand that taking dimensions of the human body is very different indeed from any operation ordinarily supposed to be similar.

The art of measurement, like every other branch of human knowledge, has been subject in some degree to evolutionary law.

Passing over the more crude efforts of earlier times* we come to the Breast Measure principle. This must have been a great advance, for it showed a larger knowledge of proportional growth. Whatever may be a cutter's individual opinions the fact remains that the human figure in its development does bear a fair proportion to its size round the chest; and though many demur to this, yet were 500 cutters each one compelled to make a coat from one measure only, and were left free to choose which it should be, there is no doubt that a large majority would select the Breast measure. The broad fact also that so many million garments have been produced mainly on this principle speaks for itself.

But further experience proved that the breast measure division was by no means a solution of the difficulty, hence admeasurement was rigidly maintained by many cutters. This latter principle has been smartly criticised. The fact is, however, that the advocates of both systems (as we have pointed out in Section II.) were contending for principles both of which were true, but neither of them contained the entire truth. Of later years this has been seen more clearly, and now we have the two methods combined. The root idea of Proportion, as exemplified in the breast measure plans, has flowered out into **Sectional proportion,** and its erstwhile rival has been modified into a **Controlling** or **Checking** method.

Measurement rightly understood ought to reveal—not size only, but form. Such a revelation can only come by a careful comparison of certain dimensions, assisted by a knowledge of Form-growth. No single measure could possibly indicate shape except on the line of strict proportion. At the same time, with a fair acquaintance of Nature's laws of growth, a large number of measures are neither necessary or desirable. One difficulty under which tailors have laboured is that of having to find certain quantities without having sufficient data. For instance, peculiarity of form and figure may be said to depend upon three elements—those of **height, width,** and **weight.** Probably if either two of these were given, with a few additional measures, a near approximation to the peculiarity of the model would have been possible. If one knew that a customer was short and also weighed heavy, it would be evident to him that that person must be stout, for the substance declared to exist by his weight not having gone in height must have gone in breadth, and so on. But tailors have generally had but one element to judge from—that of breadth, and have been too negligent respecting height. And yet several sections, as has been already shown, are **combination quantities**—dependent upon both height and breadth.

If this is so it suggests at once that, however few our measures are, they ought to be such as to indicate both the stature and girth of our customer.

And now comes the question—which are the most easy, useful, and reliable measures to take?

Of course, experienced men have different ideas and are accustomed to their peculiar methods, and though it would be foolish to dogmatize, we may consider the matter from a comprehensive and impartial view.

The following List contains most of the measures which have been approved by the trade as most useful. They are gathered from various sources, and their power briefly explained, so that the student of Form may make his own selection according to the particular system he chooses to adopt.

LIST OF APPROVED MEASURES.

Breast measure.—Taken close under arm-pits, over blade-bones at back and the true breasts in front, while the chest is normally expanded.

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* See Giles' History of Cutting, page 88. A very interesting work.

Waist measure.—At smallest part just above hip-bone.

Stature Height measure.—This is not so difficult to obtain as sometimes supposed considering exactitude is not absolutely essential. If the client be seen, after some practice, his or her height may be fairly judged; if not seen most people have an approximate knowledge of their own height, and will give it. The ground-length, from nape to ground, seven-eighths of stature, will serve as well.

These three are the most useful measures when they alone are obtainable; but still they can only give size, not form or attitude. They serve to supply the two elements of length and width.

Back-width—on to elbow, and to hand.—The first of these is useful. While taking it the measurer should have present in his mind what it *ought to be*, not that he may make it so, but that if it be less or more his observation should be quickened to "photograph" the figure and notice the divergence.

The second and third vary with the angle formed by the arm. To secure certainty the dressmakers have a rule that the hand of the measuree be lightly placed on the chest. This by making it more acute lengthens the angle about three-quarters of an inch, which it is easy to deduct.

Shoulder measures.—These are various and their nomenclature somewhat confusing. The one taken from nape of neck round the arm-hole and up to the same point again is called upper shoulder measure, top shoulder measure, or (sectional system) depth shoulder measure, and sometimes simply shoulder measure. The term used in Thornton's Sectional System is right enough if applied in the way directed therein, that is to check the depth of arm-hole, but for a general term perhaps upper shoulder measure would meet the case.

THE ORDINARY SHOULDER MEASURE.

The dimension usually and properly understood as *the* shoulder measure is from a point about opposite back pitch round the arm to starting point.

The lower shoulder measure is similarly obtained, but lower down, or from opposite arm-pit to starting point. Of these three the middle one is undoubtedly a valuable measure, well established in the trade, and has "come to stay." It passes over the most important fitting region of the body, independent of the breast size, and whether adopted as a working scale or not is constantly being used in various ways by experienced men, not only in England but on the Continent.

It is not the object of the present work to offer any System of Cutting, we deal with broad facts and principles upon which all systems are necessarily founded, otherwise it would be quite easy to state various applications of this same measure. For instance how two-ninths of it is used for depth of arm-hole and four-ninths for front of scye; how compared with breast size it indicates balance: if larger than its proper proportion it shows more material is needed at its own area—*i.e.*, the back part of figure; if smaller than its proper proportion more is needed, both in length and in width of chest, &c.

The other two shoulder measures are usually found to be an inch more in their size than the one just dealt with. They are useful in their way but no one must expect anything like mathematical exactness in measurements of the human figure, and for the reasons stated above. In theory many of these cross quantities are right and clever enough, but it will be found that the man of experience will always, when difficulty arises, make his final appeal, not to his measures but to his own judgment, and in this judgment a knowledge of Form-growth is an important ingredient. Several efforts have been made to make these shoulder measures into **attitude tellers** by comparing their quantities, but we have never seen any process by which more than an approximate result could be obtained. Their chief use is in the way of comparison with other measures.

SUMMARY OF REMARKS ON SHOULDER MEASURES.

We may sum up these remarks on shoulder measures by a diagram which will show in an easy way most, if not all, the dimensions taken by various persons *from* and *to* different points, and also the method by which they are made into **Form-Tellers.**

Fig. 18.

Let 1 be the "Tailor's starting point," nape of neck. Carrying the tape downwards in front of arm the operator proceeds carefully to

2—(front of scye), this gives him front shoulder length. Thence the tape takes a circular direction, but stopping on its way at various points. At

3—which is central waist point, one-fourth waist circumference from back seam. This gives him middle waist length. Or at

4—situate on back seam. This gives him waist suppression. Or at

5—also on back seam, but opposite to and level with bottom of arm-hole. Thus 2 to 5 gives him front of scye. Or at

6—which is higher on back-seam, opposite back-pitch. (From and to this point is the ordinary shoulder measure, as previously explained). Or, up again to

1—the starting point.

Also a back shoulder measure from 1 to 2 through B.

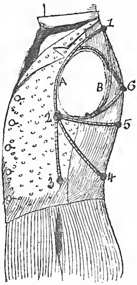

Fig. 18.

A comparison of some of these with others reveals *attitude*. For instance: the normal difference between 1, 2, 5 and 1, 2, B, 1, is four inches. If more or less than this quantity is obtained the difference indicates a change of attitude accordingly.

Again: between the ordinary shoulder measure 6, A, 2, 6, and the upper shoulder measure 1, A, 2, B, 1, there is a normal difference of one inch. If more or less than one inch is obtained the difference indicates a deeper arm-hole or a longer neck.

Again: 1, A, 2, and 2, B, 1, taken as separate measures, ought in their aggregate to agree with the upper shoulder measure taken entire,* and thus taken they serve as a check one upon another.

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* That is they ought to agree, logically speaking, but practically the two separate quantities will amount to a little more (half-an-inch or thereabouts) than the single one, although the tape in each case passes over the same area.

Front of Scye and Cross Chest measures.—These are ranged together because they both partake of width. It should be accepted as a principle that some guide is required which will show us how to divide the width or breast measure. For this we may have the front of scye (either taken directly, or obtained by shoulder or scye circumference); or we may have the size across the chest from front of arm to front of arm. Many dressmakers who supply self-measurement forms require the tape applied across the back, back-arm to back-arm, and then again from the same point round bust to the other starting point. These two dimensions have to equal the entire bust. This is evidently as a check to careless measurement, as well as a form indicator. In all of these arrangements what the front gains the back loses, and *vice versâ*.

Length measures.—The principal of these are for *height of neck* or shoulder level. Many ways are in use: for instance, we may come down from nape under arm-pit to nape again; or we may come up from a point on back seam at natural waist, or from a point eight inches down, and proceed to measure directly over the shoulder down to the central waist point; or we may work on the triangle by a measure from nape to back pitch; or we may take the quantity direct from an imaginary line stretching from one top of shoulder to the other. This latter plan has this advantage that besides being direct it educates the eye and judgment. As for calculating, we have dealt with that elsewhere, and have found that from two and a half to three and a half will cover a vast majority of forms. Another important length is to *natural waist*. This is very particular in bodices, and happily it is easier to take on females than on males. The operator must gently feel for the top of hip-bone and settle on a point level with it. Dressmakers have two useful measures which they call *long* front and *short* front. The first is from nape of neck over the bust to front of waist, and to any length below that may be required; the second is from front of neck straight down to hollow of waist at front. This latter is generally about two inches shorter than back waist length, but of course varies.

Hip and Seat measures.—These are likewise often requisite.

Another favourite measure with some people is **from back seam straight under arm to front of scye and thence to nape of neck.** This naturally divides itself into two portions, and it so happens that in the ordinary figure they are about equal; for instance, for 36 breast they are, to front of scye 12, from thence to nape 12, making 24 in all, or eight-ninths of shoulder measure, or two-thirds of breast measure. In a full-backed or a stooping form of similar height, the first of these parts increases, and the second part decreases, *but in less ratio* than the first, generally less than half the quantity, so that if front of scye became 13 the shoulder length would become 12½ or less, and so on.

There are many other dimensions which some persons take. But experience in the long run usually leads a man to prefer measures direct, short, and as few as possible. If long or cross ones are used they are best broken up or sectionized, thus limiting errors; the primary use of all quantities taken is to submit them to the **Camparative Method** in order that they may if possible reveal **Size, Form** and **Attitude.**

FORM-GROWTH AND HOSIERY, OUTFITTING, &c.

The production of ready-made clothing of different kinds, in respect to their sizes and shapes, is necessarily based on principles of **Form-growth.** Without a systemized knowledge of how the figure grows in its different parts, or at any rate without certain tabulated results obtained from such knowledge, manufacturers could not attain that high degree of success in their several branches which they undoubtedly do. But nothing is stagnant now. The demands of to-morrow will probably exceed those of to-day. The severe pressure of modern competition, if it continues, will compel still further wholesale means of production, and with it an increasing exactitude in shape, style, and fit. This demand will not be limited to any branch of trade. Already bespoke tailors are realizing this, and many orders are now executed under the new conditions. All this must grow, and side by side with it there will be more interest taken in the science of Form-growth and human proportion. Hence it behoves all those who are engaged in these businesses to give some time and attention to the subject.

Hats and Caps.—The making of head-gear to fit would not be nearly so easy as it is except for the fact that in the formation of the skull we have a hard and fixed model. The sizes of hats and caps are determined by their long and short diameters. The *mean* of their quantity is the size of the hat. Thus, if $7\frac{1}{4}$ and $6\frac{1}{2}$ inches are respectively the profile and lateral diameters, the size will be $6\frac{7}{8}$, and so on. It is thus evident we may have a long or a wide shape and yet its size might be the same. But head-gear being made in pliable materials the difficulty of fitting is much reduced. Hatters have various methods of taking the cast or shape of the head when there is any necessity for so doing; sometimes by a "lead," *i.e.*, a malleable piece of lead covered with thin leather, which takes and preserves any peculiar formation.

Shirts and Collars.—These are made according to proportion. Their number indicates length of neck-band from hole to hole. The net measurement of a man's neck is about three-quarters of half his ordinary breast measure. Add for shirt about one inch for ease and half inch more for a collar measure. A woman's neck is one-third of her chest circumference, or half waist.*

Cuffs.—Number means actual measurement in inches from button-hole to button-hole.

Gloves are made according to proportion, with size round knuckles of closed hand as a standard.

Under Vests are based on chest measure; ordinary sizes run as follows:

	Small Men's.	*Slender Men's.*	*Men's.*	*Pope Men's.*	*Outsize Men's.*
Inches ...	32	34	36	39	42

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* This is a frequently quoted axiom and is supposed to belong to the perfect form, but it cannot be quite relied on.

Pants are on similar proportions, the waist determining the size.

Combinations or Dresses are made in six sizes, according to waist measure.

	Sml. Wns.	*Slndr. Wns.*	*Wns.*	*Ps. Wns.*	*O.S. Wns.*	*Dbl. O S. Wns.*
Inches ...	24	26	28	30	32	36

Under Vests follow the same sizes.

Vests, Children's, are made in eight sizes, according to chest measure:

	1	*2*	*3*	*4*	*5*	*6*	*Maids.*	*Lge. Mds.*
Inches ...	16	18	20	22	24	26	27	28

Socks and Stockings are made in eleven sizes, according to length of foot:

Socks ...	Size	*0*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*
	Length of foot	4½	5	5½	6	6½	7	7½	8	8½	9	9½
Stockings	Size	*000*	*00*	*0*	*1*	*2*	*3*	*4*	*5*	*6*		
	Length of foot	4½	5	5½	6	6½	7	7½	8	8½		

	Maids.	*Sml. Wns.*	*Wns.*	*O.S. Wns.*
The Women's sizes are ...	8½ in.	9 in.	9½	10

Length of leg from heel to top averages three times length of foot, but sometimes two and a half.

Boots and Shoes go by length of sole. There are fourteen sizes in children's, from baby of three months:

0	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*
4	4⅜	4⅝	5	5⅜	5⅝	6	6⅜	6⅝	7	7⅜	7⅝	8	8⅜

Women's sizes follow on:

1	*2*	*3*	*4*	*5*	*6*
8⅝	9	9⅜	9⅝	10	10⅜

Men's sizes are seven in number:

7	*8*	*9*	*10*	*11*	*12*	*13*
10⅝	11	11⅜	11⅝	12	12⅜	12⅝

Besides these there are cross sizes, as for instance a broad 7 or narrow 8, &c.

Now when we remember that all ready-made garments are cut as near as possible according to the known proportions of human growth, not only in their general size but in their detail, it must be evident to everyone that the more completely the laws of human growth are understood, the more satisfactory must all kinds of clothing become in respect to their shape and comfort. And this applies to every kind of garment, from crown of head to sole of foot.

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PART V.—TABLES.

PREFATORY NOTE.

In presenting the following series of TABLES of MEASUREMENTS, the author feels himself in a position somewhat similar to that which Dr. Johnson describes in the Preface to his Dictionary. That distinguished *literator*—the "*Architectus verborum*" of our English language—likens himself to those who toil at the lower employments of life, who are exposed to censure, without hope of praise. Other writers may commit errors and be excused, but who forgives the maker of Dictionaries? "Every author," says Johnson, "may aspire to praise; the lexicographer can only hope to escape reproach."

He who compiles Lists of figures, and attempts to reduce Form-growth to anything like rule or law, can hope for no better fate than that anticipated by Boswell's idol. But as the present writer is naturally anxious to fall softly (if fall he must), he will make provision for so doing by a few words of explanation. And

FIRST—The following Lists are intended to serve a distinctly **practical purpose.** Hence they have been drawn up with considerable care, derived from *real* measures and compared with other Lists. Correctness (so far as such could be attained from the nature of the case) has been aimed at.

SECOND—Several of the Lists have these words attached—"**Reduced to Rule.**" This means that in addition to observing the aforesaid conditions, a Rule or Law of growth has been sought for and in most cases found. Consequently, the Tables are not only *Ready Reckoners*, but *Proofs* that there is such a science as Form-growth.

THIRD—They may be **used** or **abused.** Their use consists of a reference being made to them in the ordinary way, but their fullest value will be extracted when they lead the student to do his own thinking, comparing, and noticing, and thus lead him along an already prepared path to a larger and more intimate acquaintance with the human model. Their abuse consists of expecting to find the measurements and peculiarities of every figure by simply referring to the Table, and when variations are found of hastily condemning the whole thing. Remember the two Laws treated of in our first and second Sections—the Law of Diversity and the Law of Control; or, as Mr. D. J. Jones expresses it, "Provide for Form and give it a limit."

FOURTH—**How to use the Tables.** In normal figures this will simply be a matter of referring in the ordinary way, but with abnormal cases it will be more complex. In drawing up any working list a difficulty at once presents itself. There is a dual element to consider. Must height, or breadth, or both be taken as a standard, and if so in what several parts? The answer would seem to be: in sections chiefly affected by height, height should be taken; in sections chiefly affected by breadth, breadth should be taken; and in combination sections, both. This has been the principle of adoption, and should be the guiding thought in using the Tables. Some of the Lists here given are of great practical use. Wholesale clothiers are wont to attach a high value to their Size and Cutting Lists; they are often the gradual outcome of considerable experience. Several here given are from first-class houses, and represent a value very far greater than the price of this Volume. Such Tables are often worth pounds.

TABLE No. 1.

MEASUREMENTS OF JUVENILES.

The following Table has been carefully compiled from the ascertained proportions of scientists, and from various lists of wholesale manufacturers, and it is believed follows on the track of Nature as faithfully as possible.

Size.	Age.	Height.		Body Garments.										Leg Garments.									
		ft.	in.	Height of neck.	Scye depth.	Natural waist.	Breast.	Waist.	Back.	Elbow.	Sleeve length.	Scye.	Shoulder.	Side seam to hollow.	Leg length.	Short knicker leg length.	Waist.	Seat.	Thigh.	Knee.	Small.	Calf.	Ankle.
000	3 to 4	3	2	1¾	5½	10½	22	23	4½	11	17¼	10	16	22½	16	7	22¼	22¼	12¼	8¾	8	8½	6
00	4½	3	5	1¾	5⅝	10¾	22½	23	4⅝	11¼	18	10¼	17¼	23½	17	8¼	22½	22½	12½	9	8¼	8¾	6¼
0	5	3	6	1⅞	5⅝	11	23	23¼	4⅞	11¾	18¾	10½	17½	24¼	18	9	22½	23¾	13⅜	9⅛	8½	9	6½
1	6	3	8	1⅞	5¾	11½	23½	23½	5	12½	19¾	10¾	17¾	26¼	19½	10	23	24¼	13¾	9⅜	8¾	9¼	6⅝
2	7	3	9	2	5⅞	12	24	24	5⅛	13½	21	11¼	18	27½	20½	10¾	23½	25	14	9½	9	9½	6¾
3	8	3	10½	2	6	12½	25	25	5¼	14	22½	11½	18½	28½	21½	12	24	25¾	14⅝	9¾	9¼	9⅝	6⅞
4	9	4	0	2⅛	6¼	12¾	26	25½	5½	15	23½	12	19¼	29½	22¼	13	24½	27	15	10⅛	9½	9⅞	6⅞
5	10	4	1	2⅛	6½	13	27	26½	5⅝	15¾	24	12½	20	31¾	24¼	14	25	27¾	15¾	10½	9¾	10¼	7
6	11	4	2½	2⅛	6⅝	13⅛	27½	27	5¾	16	24¾	13	21	32½	25¼	15	25½	28¼	16⅛	10¾	9⅞	10⅜	7¼
7	11½	4	4	2¼	7	14	28	27¼	6	16½	26	13¼	21	33	25½	15½	26½	28½	16¼	10⅞	10	10½	7½

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TABLE No. 2.—MEASUREMENTS OF BOYS AND YOUTHS.

		ft.	in.																				
7	12	4	6	2⅜	7¼	14½	29	27½	6⅛	17	27	13½	21½	35	26½	16	27¼	30	16⅞	11	10¼	10¾	7¾
8	13	4	9	2½	7½	15	30	28	6¼	18	28	14	22	36½	28	17	27¾	31	17½	11¼	10⅜	11	8
9	14	4	11	2⅝	7¾	15½	31	28½	6⅜	18½	29	14½	22½	37½	28½	18	28¼	32	18	11¾	10¾	11¾	8¼
10	14½	5	1	2⅝	8	16	31½	29	6½	19	29½	14¾	22¾	38¾	29½	...	28½	32½	18¼	12⅛	10⅞	12¼	8⅜
11	15	5	3	2¾	8¼	16¼	32	29¼	6¾	19½	30	15	23½	40¼	30	...	28¾	33	18½	12⅜	11	12½	8⅝
12	16	5	4	2⅞	8½	16½	33	29½	6⅞	20	30½	15¼	24¼	40¾	31	...	29	34	19⅛	12¾	11⅛	12⅝	8⅞

TABLE No. 3.

PROPORTIONATE MEASUREMENT OF MALES.

Prepared chiefly for reference and comparison.

Breast.	Waist.	Shoulder Measure.	Natural Waist.	Height.		Round Scye.	Depth of Scye.	Leg Length.	Fork to Hollow excludes Waistb'nd	Seat.
				ft.	in.					
12	10	18	11	3	6½	11	5¾	19¼	6½	13
12½	10⅜	18¾	11½	3	8	11½	6	20	6¾	13½
13	10⅞	19½	12	3	10	12	6¼	21	7	14¼
13½	11¼	20¼	12½	4	0	12½	6½	22	7¼	14⅝
14	11⅝	21	12⅞	4	1½	12⅞	6¾	22¾	7½	15⅙
14½	12	21¾	13⅜	4	3½	13⅜	7	23¾	7⅞	15½
15	12½	22½	13⅞	4	5	13⅞	7¼	24½	8¼	16¼
15½	12⅞	23¼	14¼	4	7	14¼	7½	25½	8½	16¾
16	13⅜	24	14⅝	4	8½	14⅝	7¾	26¼	8¾	17⅓
16½	13¾	24¾	15⅛	4	10½	15⅛	7⅞	27¼	9	17⅞
17	14⅛	25½	15⅝	5	0½	15⅝	8⅛	28¼	9¼	18⅜
17½	14⅝	26¼	16	5	2½	16	8⅜	29¼	9½	19
18	15	27	16½	5	4	16½	8⅝	30	9⅞	19½
18½	15⅜	27¾	17	5	5½	17	8⅞	30¾	10⅛	20
19	15⅞	28½	17½	5	7½	17½	9⅛	31¾	10⅜	20½
19½	16¼	29¼	17⅞	5	9	17⅞	9⅜	32½	10⅝	21⅛
20	16⅝	30	18⅜	5	11	18⅜	9⅝	33½	11	21⅔
20½	17	30¾	18¾	6	0½	18¾	9¾	34¼	11¼	21¾
21	17½	31½	19¼	6	2	19¼	10	35	11½	22¾
21½	17⅞	32¼	19¾	6	4	19¾	10¼	36	11¾	23⅓
22	18⅜	33	20¼	6	5½	20⅛	10½	36	12	23⅚
22½	18¾	33¾	20⅝	6	7½	20⅝	10¾	37¾	12¼	24
23	19⅛	34½	21⅛	6	9	21⅛	11	38½	12⅝	25
23½	19½	35¼	21⅝	6	11	21⅝	11¼	39	13	25½
24	20	36	22⅛	7	1	22	11½	40	13¼	26

TABLE No. 4.

MALE FIGURE.—*Dimensions for Breast, Waist and Seat, based on actual Measurements and Reduced to Rule.*

Breast.	Normal Waist, reckoned as $\frac{7}{8}$ of Breast.	Average Waist, according to Rule.	Seat.
33	$28\frac{7}{8}$	$29\frac{1}{8}$	$35\frac{7}{8}$
34	$29\frac{3}{4}$	$30\frac{1}{4}$	$36\frac{3}{8}$
35	$30\frac{5}{8}$	$31\frac{5}{8}$	37
36	$31\frac{1}{2}$	33	$37\frac{1}{2}$
37	$32\frac{3}{8}$	$34\frac{3}{8}$	$38\frac{1}{2}$
38	$33\frac{1}{4}$	$35\frac{3}{4}$	$39\frac{1}{2}$
39	$34\frac{1}{8}$	$37\frac{1}{8}$	$40\frac{1}{2}$
40	35	$38\frac{1}{2}$	$41\frac{7}{8}$
41	$35\frac{7}{8}$	$39\frac{7}{8}$	$42\frac{7}{8}$
42	$36\frac{3}{4}$	$41\frac{1}{4}$	$43\frac{3}{4}$
43	$37\frac{5}{8}$	$42\frac{5}{8}$	$44\frac{3}{4}$
44	$38\frac{1}{2}$	44	$45\frac{1}{2}$
45	$39\frac{3}{4}$	$45\frac{3}{8}$	$46\frac{3}{8}$
46	$40\frac{1}{4}$	$46\frac{3}{4}$	$47\frac{1}{8}$
47	$41\frac{1}{8}$	$48\frac{1}{8}$	48
48	42	$49\frac{1}{2}$	$48\frac{3}{4}$
49	$42\frac{7}{8}$	$50\frac{7}{8}$	$49\frac{1}{2}$
50	$43\frac{3}{4}$	$52\frac{1}{4}$	$50\frac{3}{8}$

If the second and third columns be compared, it will be noticed that in the smaller sizes they differ but little, but with the increase of bulk they diverge more and more; also, that the third column continually gains, not only on the one-eighth normal waist, but on the chest likewise. At 44 breast and waist are equal, while at 50 the latter is $2\frac{1}{4}$ in excess. It is also in advance of the seat, which compares well with the chest at 47 and 48. Now this Normal list would represent finely built forms, often found in ordinary sizes but very rarely in larger ones, whereas the Average list shows the more frequent way of human growth. The use of the Table is to exhibit more vividly than by mere words this fact of development, at the same time it has a direct practical value.

TABLE No. 5.

FOR TROUSERS AND BREECHES.

This list gives measurements for trousers and breeches, divided into lengths and widths, obtained from actual averages, and reduced to rule. Height from 5 ft. to 6 ft. 3 in. Seat 30 in. to 48 in.

LENGTHS.					WIDTHS.					
Height.		Leg.*	Rise to hollow of Waist.	Small.	Waist.	Seat.	Knee.	Small.	Tight Thigh.	Calf.
ft.	in.									
5	0	$27\frac{1}{2}$	$8\frac{4}{7}$	$14\frac{3}{8}$	$26\frac{1}{4}$	30	$11\frac{1}{4}$	$9\frac{3}{8}$	$16\frac{7}{8}$	No rule can be given; in majority of cases size of calf follows that of knee.
5	1	$28\frac{1}{4}$	$8\frac{5}{7}$	$14\frac{3}{5}$	28	32	12	10	18	
5	2	$28\frac{3}{4}$	$8\frac{6}{7}$	$14\frac{15}{16}$	$29\frac{3}{4}$	34	$12\frac{3}{4}$	$10\frac{5}{8}$	$19\frac{1}{8}$	
5	3	$29\frac{3}{8}$	9	$14\frac{3}{4}$	$31\frac{1}{2}$	36	$13\frac{1}{2}$	$11\frac{1}{4}$	$20\frac{1}{4}$	
5	4	30	$9\frac{1}{7}$	$15\frac{1}{2}$	$34\frac{1}{4}$	38	$14\frac{1}{4}$	$11\frac{7}{8}$	$20\frac{3}{8}$	
5	5	$30\frac{5}{8}$	$9\frac{2}{7}$	$16\frac{1}{16}$	37	40	15	$12\frac{1}{2}$	$22\frac{1}{2}$	
5	6	$31\frac{1}{4}$	$9\frac{3}{7}$	$16\frac{1}{16}$	$39\frac{3}{4}$	42	$15\frac{3}{8}$	$12\frac{3}{4}$	$23\frac{5}{8}$	
5	7	$31\frac{7}{8}$	$9\frac{4}{7}$	$16\frac{1}{8}$	$42\frac{1}{2}$	44	$15\frac{3}{4}$	13	$24\frac{3}{4}$	
5	8	$32\frac{1}{2}$	$9\frac{5}{7}$	$16\frac{3}{8}$	$45\frac{1}{4}$	46	$16\frac{1}{8}$	$13\frac{1}{4}$	$25\frac{7}{8}$	
5	9	$33\frac{1}{8}$	$9\frac{6}{7}$	$16\frac{15}{16}$	48	48	$16\frac{1}{2}$	$13\frac{1}{2}$	27	
5	10	$33\frac{3}{4}$	10	$17\frac{3}{16}$						
5	11	$34\frac{3}{8}$	$10\frac{1}{7}$	$17\frac{1}{2}$						
6	0	35	$10\frac{2}{7}$	$17\frac{3}{4}$						
6	1	$35\frac{5}{8}$	$10\frac{3}{7}$	18						
6	2	$36\frac{1}{4}$	$10\frac{4}{7}$	$18\frac{1}{4}$						
6	3	$36\frac{7}{8}$	$10\frac{5}{7}$	$18\frac{15}{16}$						

NOTE.—For position of knee reckon about 3 in. *above* small; for calf 3 in. or $3\frac{1}{2}$ in. *below* small; for bottom of calf (as in pants) from 4 to 5 in., properly one-sixteenth of height.

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* Reckoned according to the *last mentioned* Rule on page 59. The next two columns are taken from this one according to the Rules given in Part III.

TABLE No. 6.

SCALE OF MEASUREMENTS FOR FEMALES—STRICTLY PROPORTIONATE.

Prepared chiefly for reference and comparison.

Breast.	Bust.	Waist.	Sh'uld'r.	Natural Waist Length.	Under-arm.	Scye Circumference.	Neck.	Elbow.	Sleeve Length.	Height.	
										Ft.	In.
24	24	16	18	11⅜	6	11	10½	15	21½	3	8½
25	25	16⅔	18¾	11⅝	6⅛	11¼	10⅞	15½	22	3	9½
26	26	17⅓	19½	11⅞	6¼	12	11⅜	16	22½	3	10½
27	27	18	20¼	12⅛	6⅜	12½	11¾	16½	23	3	11½
28	28	18⅔	21	12⅞	6⅝	13	12¼	17¼	24½	4	2½
29	29¼	19⅓	21¾	13¾	7⅛	13½	12¾	18	26	4	6
30	30¼	20	22½	14⅝	7⅝	14	13⅛	18½	27½	4	9½
31	31½	20⅔	23¼	15¼	7¾	14½	13⅝	18¾	27¾	5	0
32	32¾	21⅓	24	15½	7⅞	15	14	19	28	5	1
33	34	22	24¾	15⅞	8	15¼	14½	19⅜	28¼	5	2½
34	35	22⅔	25½	16	8¼	15¾	14¾	19⅜	28⅜	5	3
35	36	23⅓	26¼	16⅛	8⅜	16⅛	15⅛	19⅝	28¾	5	3½
36	37	24	27	16¼	8⅜	16½	15⅜	19⅝	29	5	4
37	38	24⅔	27¾	16⅜	8½	17	15⅞	19¾	29¼	5	4½
38	39	25⅓	28½	16½	8½	17½	16	19¾	29½	5	5
39	40	26	29¼	16⅝	8⅝	17¾	16⅜	20	29¾	5	5½
40	41	26⅔	30	16¾	8⅝	18⅓	16⅝	20	30	5	6
41	42	27⅓	30¾	16⅞	8¾	19	16⅞	20⅛	30⅜	5	6½
42	43	28	31½	17	8¾	19½	17¼	20⅜	30¾	5	7
43	44	28⅔	32¼	17⅛	8⅞	19¾	17⅜	20½	31	5	7½
44	45	29⅓	33	17¼	8⅞	20	17⅞	20¾	31¼	5	8
45	46	30	33¾	17⅜	9	20⅓	18¼	21¼	31½	5	8½
46	47	30⅔	34½	17½	9	21	18½	21½	31¾	5	9

TABLE No. 7.

BREAST, WAIST, AND SEAT.—FEMALE FIGURE.

BASED ON ACTUAL MEASUREMENTS AND REDUCED TO RULE.

Explanation.—This Table consists of five columns. In the first are the sizes of breast, from which the other dimensions are reckoned. Column 2 shows the strictly proportionate waist as ⅔ of breast. This standard, however, is not reached except when women attain the flower of their development, and having passed it, they gradually lose their ideal form. But they appear to do so according to law, which a comparison of average measurements warrants us in reducing to a rule. The ideal form is 34 bust; in such a size it is no uncommon thing to find the waist at ⅔ of such a quantity, therefore the extra rules of Column 3 operate above and below this size. It is not necessary to enter into a detailed exposition of the Rules adopted (especially as their results are given), but their underlying principle is simple enough. Consider for a moment that in the ideal form a definite proportion is taken from the breast size and the remainder is left as the waist; but in the larger and smaller examples a different proportion is subtracted, and its amount is determined by the quantity or distance that each example may be from the ideal. The further away the more there is left, so that in childhood there is no definition of waist (see below where both breast and waist are 24 inches). This is agreeable to Nature, and in addition, the quantities given are not arbitrary or merely guessed at, but are "according to law."

Breast.	Proportionate Waist, Reckoned as ⅔.	Average Waist, According to Rules.	Seat, ⅙ of Breast more than Breast.	Seat, Stout and Slender.	
22	14¾	24¾	25¾	Tall Slender Figures + 1/7 B. M.	25¼
24	16	24	28		27½
26	17⅓	24⅓	30⅓		29¾
28	18⅔	23⅔	32⅔		32
30	20	23	35		34⅓
32	21⅓	22⅓	37⅓		36½
34 Ideal Form.	22⅔	22⅔	39⅔	Short Stout Figures + 1/5 B. M.	42
36	24	24½	42		43¼
38	25⅓	26½	44⅓		45½
40	26⅔	28⅔	46⅔		48
42	28	31	49		50½
44	29⅓	33⅓	51⅓		52¾
46	30⅔	35⅔	53⅔		54¼

TABLE No. 8.

HEIGHT DIMENSIONS OF FEMALES FROM 4 FT. 10 IN. TO 5 FT. 8 IN.

BASED ON ACTUAL MEASUREMENTS AND REDUCED TO RULE.

1 Total Height.		2 Scye Depth.	3 Scye Diameter.	4 Natural Waist.	5 Pelvic Length or Rise.	6 Leg Length.	7 To Small of Leg.	8 Under-arm.	9 Elbow.	10 Sleeve.
Ft.	In.			Inches.		Inches.	Inches.		Inches.	Inches.
4	10	See under Combination Measures. Table No. 10.	See under Combination Measures. Table No. 10.	$14\frac{3}{4}$	See under Combination Measures. Table No. 10.	$26\frac{5}{8}$	$13\frac{1}{16}$	See under Combination Measures. Table No. 10.	$17\frac{3}{4}$	$26\frac{3}{4}$
4	11			15		$27\frac{3}{16}$	$13\frac{3}{4}$		$17\frac{3}{4}$	$27\frac{1}{4}$
5	0			$15\frac{1}{4}$		$27\frac{1}{2}$	14		18	$27\frac{3}{4}$
5	1			$15\frac{1}{2}$		$28\frac{1}{16}$	$14\frac{1}{4}$		$18\frac{1}{4}$	$28\frac{1}{4}$
5	2			$15\frac{3}{4}$		$28\frac{3}{8}$	$14\frac{7}{16}$		$18\frac{3}{4}$	$28\frac{3}{4}$
5	3			16		$29\frac{3}{16}$	$14\frac{3}{4}$		$19\frac{1}{4}$	$29\frac{1}{4}$
5	4			$16\frac{1}{4}$		$29\frac{3}{4}$	$14\frac{5}{8}$		$19\frac{3}{4}$	$29\frac{3}{4}$
5	5			$16\frac{1}{2}$		$30\frac{5}{16}$	$15\frac{3}{8}$		$20\frac{1}{4}$	$30\frac{1}{4}$
5	6			$16\frac{3}{4}$		$30\frac{7}{8}$	$15\frac{3}{4}$		$20\frac{1}{2}$	$30\frac{3}{4}$
5	7			17		$31\frac{7}{16}$	16		21	$31\frac{1}{4}$
5	8			$17\frac{1}{4}$		32	$16\frac{1}{4}$		$21\frac{1}{4}$	$31\frac{3}{4}$

TABLE No. 9.

WIDTH DIMENSIONS OF FEMALES FROM 30 TO 46 IN. CHEST.

BASED ON ACTUAL AVERAGES AND REDUCED TO RULE.

Chest.	Waist.	Should'r.	Hip.*	Seat.	Scye Circum-ference.	Neck.	Back Width.	Across Bust.	Round Knee.	Round Small.
In.	Inches.	Inches.	Inches.		Inches.	Inches.	Inches.	Inches.	Inches.	Inches.
30	23	$22\frac{1}{2}$	29	See Table No. 7. Breast, Waist, & Seat, page 87.	$13\frac{3}{4}$	$13\frac{1}{8}$	$5\frac{1}{8}$	$7\frac{1}{2}$	$11\frac{3}{4}$	$10\frac{3}{4}$
32	$22\frac{1}{3}$	$23\frac{3}{4}$	$29\frac{3}{4}$		14	14	$5\frac{1}{4}$	8	$12\frac{1}{2}$	$11\frac{1}{4}$
34	$22\frac{2}{3}$	24	$31\frac{1}{6}$		$14\frac{3}{4}$	$14\frac{3}{4}$	$5\frac{1}{2}$	$8\frac{1}{2}$	$13\frac{1}{4}$	12
36	24	$25\frac{7}{8}$	33		16	$15\frac{3}{8}$	6	9	14	$12\frac{1}{2}$
38	$26\frac{1}{2}$	27	$35\frac{5}{12}$		17	16	$6\frac{1}{8}$	$9\frac{1}{2}$	$14\frac{1}{4}$	$12\frac{3}{4}$
40	$28\frac{2}{3}$	$27\frac{3}{4}$	$37\frac{2}{3}$		$17\frac{3}{4}$	$16\frac{5}{8}$	$6\frac{1}{4}$	10	$14\frac{5}{8}$	$13\frac{1}{8}$
42	31	$28\frac{1}{2}$	40		$18\frac{1}{4}$	$17\frac{1}{4}$	$6\frac{1}{2}$	$10\frac{5}{8}$	15	$13\frac{1}{2}$
44	$33\frac{1}{3}$	$29\frac{1}{4}$	$42\frac{1}{3}$		$18\frac{3}{4}$	$17\frac{7}{8}$	$6\frac{3}{4}$	$11\frac{1}{4}$	$15\frac{3}{8}$	$13\frac{5}{8}$
46	$35\frac{2}{3}$	30	$44\frac{2}{3}$		$19\frac{1}{4}$	$18\frac{1}{2}$	7	$11\frac{3}{4}$	$15\frac{3}{4}$	$14\frac{1}{4}$

* Three inches below Waist.

TABLE No. 10.

FEMALES.—*Combined Dimensions, or measures of parts of the figure which depend both on its Height and its Girth.*

Height from 4 ft. 10 in. to 5 ft. 8 in.; Chest 30 to 46 in.

Height.		Chest.	Scye depth.	Scye diameter.	Pelvic length or rise of body.	Underarm.	Height.		Chest.	Scye depth.	Scye diameter.	Pelvic length or rise of body.	Underarm.
Ft.	In.	Inches.	Inches.	Inches.	Inches.	Inches.	Ft.	In.	Inches.	Inches.	Inches.	Inches.	Inches.
4	**10**	30	7½	4½	8¼	7½	**5**	**4**	30	7⅞	4½	9	8⅝
,,	,,	32	7¾	5	8⅜	7¼	,,	,,	32	8⅛	5	9⅛	8⅜
,,	,,	34	8	5¼	8⅞	7	,,	,,	34	8⅜	5¼	9 9/16	8⅛
,,	,,	36	8¼	5½	9	6¾	,,	,,	36	8⅝	5½	9 11/16	7⅞
,,	,,	38	8½	5¾	9¼	6½	,,	,,	38	8⅞	5¾	9 15/16	7⅝
,,	,,	40	8¾	6	9½	6¼	,,	,,	40	9⅛	6¼	10 3/16	7⅜
,,	,,	42	9	6½	9¾	6	,,	,,	42	9⅜	6½	10⅞	7⅛
,,	,,	44	9¼	6¾	10	5¾	,,	,,	44	9⅝	6¾	10⅞	6⅞
,,	,,	46	9½	7	10¼	5½	,,	,,	46	9⅞	7	11⅜	6⅝
5	**0**	30	7⅝	4½	8½	7⅝	**5**	**6**	30	8	4½	9 5/16	9
,,	,,	32	7⅞	5	8¾	7⅝	,,	,,	32	8¼	5	9¾	8¾
,,	,,	34	8⅛	5¼	9⅛	7⅜	,,	,,	34	8½	5¼	10	8½
,,	,,	36	8⅜	5½	9¼	7⅛	,,	,,	36	8¾	5½	10⅛	8¼
,,	,,	38	8⅝	5¾	9½	6⅞	,,	,,	38	9	5¾	10⅜	8
,,	,,	40	8⅞	6¼	9⅝	6⅝	,,	,,	40	9¼	6¼	10⅝	7¾
,,	,,	42	9⅛	6½	9⅞	6⅜	,,	,,	42	9½	6½	10⅞	7½
,,	,,	44	9⅜	6¾	10¼	6⅛	,,	,,	44	9¾	6¾	11⅛	7¼
,,	,,	46	9⅝	7	10½	5⅞	,,	,,	46	10	7	11⅜	7
5	**2**	30	7¾	4½	8⅝	8¼	**5**	**8**	30	8⅛	4½	9⅙	9⅛
,,	,,	32	8	5	9	8	,,	,,	32	8⅜	5	9½	8⅞
,,	,,	34	8¼	5¼	9⅜	7¾	,,	,,	34	8⅝	5¼	9⅞	8⅝
,,	,,	36	8½	5½	9 7/16	7½	,,	,,	36	8⅞	5½	10	8⅜
,,	,,	38	8¾	5¾	9 11/16	7¼	,,	,,	38	9⅛	5¾	10⅛	8⅛
,,	,,	40	9	6¼	10	7	,,	,,	40	9⅜	6¼	10½	7⅞
,,	,,	42	9¼	6½	10 3/16	6¾	,,	,,	42	9⅝	6½	10¾	7⅝
,,	,,	44	9½	6¾	10 7/16	6½	,,	,,	44	9⅞	6¾	11	7⅜
,,	,,	46	9¾	7	10 11/16	6¼	,,	,,	46	10⅛	7	11¼	7⅛

TABLE No. 11.

LENGTHS OF GARMENTS.

This Table shows at a glance what length is required to reach the most prominent parts of any figure, ranging from 4 ft. 6 in. to 6 ft.

Height.	To Elbow or to Natural Waist.	To Prominence of Seat.	To just Below Wrist or to Fork.	To Finger tips.	To Top of Knee-cap.	To Hollow of Leg or to Small.	To Prominence of Calf.	To Ankle.	Ground Length.
Ft. In.									
4 6	14	$20\frac{3}{4}$	$24\frac{1}{4}$	$28\frac{1}{4}$	$29\frac{3}{4}$	$34\frac{1}{4}$	$37\frac{1}{8}$	$43\frac{7}{8}$	$47\frac{1}{4}$
4 7	$14\frac{1}{4}$	$21\frac{1}{8}$	$24\frac{9}{16}$	$28\frac{3}{4}$	$30\frac{3}{8}$	$34\frac{7}{8}$	$37\frac{13}{16}$	$44\frac{11}{16}$	$48\frac{1}{8}$
4 8	$14\frac{1}{2}$	$21\frac{1}{2}$	25	$29\frac{1}{4}$	31	$35\frac{1}{2}$	$38\frac{1}{2}$	$45\frac{1}{2}$	49
4 9	$14\frac{3}{4}$	$21\frac{7}{8}$	$25\frac{15}{16}$	$29\frac{3}{4}$	$31\frac{5}{8}$	$36\frac{1}{8}$	$39\frac{3}{16}$	$46\frac{5}{16}$	$49\frac{7}{8}$
4 10	15	$22\frac{1}{4}$	$26\frac{3}{8}$	$30\frac{1}{4}$	$32\frac{1}{4}$	$36\frac{3}{4}$	$39\frac{7}{8}$	$47\frac{1}{8}$	$50\frac{3}{4}$
4 11	$15\frac{1}{4}$	$22\frac{5}{8}$	$26\frac{5}{16}$	$30\frac{3}{4}$	$32\frac{7}{8}$	$37\frac{3}{8}$	$40\frac{9}{16}$	$47\frac{15}{16}$	$51\frac{5}{8}$
5 0	$15\frac{1}{2}$	23	$26\frac{3}{4}$	$31\frac{1}{4}$	$33\frac{1}{2}$	38	$41\frac{1}{4}$	$48\frac{3}{4}$	$52\frac{1}{2}$
5 1	$15\frac{3}{4}$	$23\frac{3}{8}$	$27\frac{3}{16}$	$31\frac{3}{4}$	$34\frac{1}{8}$	$38\frac{5}{8}$	$41\frac{15}{16}$	$48\frac{7}{8}$	$53\frac{3}{8}$
5 2	16	$23\frac{3}{4}$	$27\frac{5}{8}$	$32\frac{1}{4}$	$34\frac{3}{4}$	$39\frac{1}{4}$	$42\frac{5}{8}$	$50\frac{3}{8}$	$54\frac{1}{4}$
5 3	$16\frac{1}{4}$	$24\frac{1}{8}$	$28\frac{1}{16}$	$32\frac{3}{4}$	$35\frac{3}{8}$	$39\frac{7}{8}$	$43\frac{5}{8}$	51	$55\frac{1}{8}$
5 4	$16\frac{1}{2}$	$24\frac{1}{2}$	$28\frac{1}{2}$	$33\frac{1}{4}$	36	$40\frac{1}{2}$	44	52	56
5 5	$16\frac{3}{4}$	$24\frac{7}{8}$	$28\frac{15}{16}$	$33\frac{3}{4}$	$36\frac{5}{8}$	$41\frac{1}{8}$	$44\frac{11}{16}$	$52\frac{3}{4}$	$56\frac{7}{8}$
5 6	17	$25\frac{1}{4}$	$29\frac{3}{8}$	$34\frac{1}{4}$	$37\frac{1}{4}$	$41\frac{3}{4}$	$45\frac{3}{8}$	$53\frac{1}{8}$	$57\frac{3}{4}$
5 7	$17\frac{1}{4}$	$25\frac{5}{8}$	$29\frac{13}{16}$	$34\frac{3}{4}$	$37\frac{7}{8}$	$42\frac{3}{8}$	$46\frac{1}{8}$	$54\frac{1}{2}$	$58\frac{5}{8}$
5 8	$17\frac{1}{2}$	26	$30\frac{1}{4}$	$35\frac{1}{4}$	$38\frac{1}{2}$	43	$46\frac{3}{4}$	$55\frac{1}{4}$	$59\frac{1}{2}$
5 9	$17\frac{3}{4}$	$26\frac{3}{8}$	$30\frac{11}{16}$	$35\frac{3}{4}$	$39\frac{1}{8}$	$43\frac{5}{8}$	$47\frac{7}{16}$	$56\frac{1}{8}$	$60\frac{3}{8}$
5 10	18	$26\frac{3}{4}$	$31\frac{1}{8}$	$36\frac{1}{4}$	$39\frac{3}{4}$	$44\frac{1}{4}$	$48\frac{1}{8}$	$56\frac{7}{8}$	$61\frac{1}{4}$
5 11	$18\frac{1}{4}$	$27\frac{1}{8}$	$31\frac{9}{16}$	$36\frac{3}{4}$	$40\frac{3}{8}$	$44\frac{7}{8}$	$48\frac{7}{8}$	$57\frac{7}{8}$	$62\frac{1}{8}$
6 0	$18\frac{1}{2}$	$27\frac{1}{2}$	32	$37\frac{1}{4}$	41	$45\frac{1}{2}$	$49\frac{1}{2}$	$58\frac{1}{2}$	63

TABLE No. 12.

BALANCE.

Natural Waist.	One-fourth of Waist Circumference.	Back Balance.	Natural Waist.	One-fourth of Waist Circumference.	Back Balance.	Natural Waist.	One-fourth of Waist Circumference.	Back Balance.
16	7½	18	17½	7½	19½	19	7½	21
”	8	18¼	”	8	19¾	”	8	21¼
”	8½	18½	”	8½	20	”	8½	21½
”	9	18¾	”	9	20¼	”	9	21¾
”	9½	19	”	9½	20½	”	9½	22
”	10	19¼	”	10	20¾	”	10	22¼
”	10½	19½	”	10½	21	”	10½	22½
”	11	19¾	”	11	21¼	”	11	22¾
”	11½	20⅛	”	11½	21½	”	11½	23
”	12	20⅜	”	12	21¾	”	12	23¼
16½	7½	18¾	18	7½	20	19½	7½	21¼
”	8	19	”	8	20¼	”	8	21½
”	8½	19¼	”	8½	20½	”	8½	21¾
”	9	19½	”	9	20¾	”	9	22
”	9½	19¾	”	9½	21	”	9½	22¼
”	10	20	”	10	21¼	”	10	22½
”	10½	20¼	”	10½	21½	”	10½	22¾
”	11	20½	”	11	21¾	”	11	23
”	11½	20¾	”	11½	22	”	11½	23¼
”	12	21	”	12	22¼	”	12	23½
17	7½	19	18½	7½	20½	20	7½	21½
”	8	19¼	”	8	20¾	”	8	21¾
”	8½	19½	”	8½	21	”	8½	22
”	9	19¾	”	9	21¼	”	9	22¼
”	9½	20	”	9½	21½	”	9½	22½
”	10	20¼	”	10	20¾	”	10	22¾
”	10½	20½	”	10½	21	”	10½	23
”	11	20¾	”	11	21¼	”	11	23¼
”	11½	21	”	11½	21½	”	11½	23½
”	12	21¼	”	12	21¾	”	12	23¾

Add Three-fourths of an inch to above quantities for Front Balance.

Balance, in tailoring, may be defined as the correct and relative length of the back and front parts of a garment. By the term **correct** is implied that such lengths shall have a determinate accuracy in respect to **some other principal measurement,** as for instance the size of breast or of waist; by the term **relative** is implied that back and front lengths shall bear a relation **one to another**—it may be an equal, or it may be a compensating relation.

There are many ways of taking balance measures on the figure, and also of applying them. Mr. Winter, in his "Method of Testing Patterns," has formulated an excellent plan for balancing, which exhibits most clearly the two principles just set down—a plan which the present writer has on several occasions brought before the notice of the trade.

It is not the purpose of this work to advocate any special system of either cutting or balancing, but there is one well-known process of the latter method which has been advanced by many authorities in England, Germany and other places, and for this reason may be taken to serve as an illustration. A pair of scales are not of much use without **weights as standards,** and no means of balancing among tailors can be satisfactory without we have what will answer to these weights. In a word, we need to know what a measure *ought to be*. The Table here worked out may be taken, not only for what it is worth as applied to one particular way of balancing, but as suggestive to thoughtful minds how other plans may be similarly developed.

The method in question is simply this: to find the central-waist point at a point in the natural waist just above haunch-bone, by measuring thence from back seam one-fourth of waist circumference; and from this same point measuring also from nape of neck. This last measure is the **Back Balance.**

Now it will be seen at once that this little arrangement consists of **three** quantities —or shall we say it comprises three lines, which take the form of a right-angled triangle. The back seam is the vertical line, the one-fourth of waist is the horizontal, and the back balance from nape to central-waist point is the hypothenuse. The length of this latter must depend on the two former; that is on the length of waist, and the size of waist (one-fourth being taken). The sum has already been worked out.

The Table gives us its proper length, not in its strictly mathematical form, but with a slight addition suggested by experience in actual measurements, no doubt arising from the superficial peculiarity of the figure. We may thus see at a glance what the back balance *ought to be* for any two measures of waist length and waist girth; and let it be remembered that both these dimensions are such as almost every operator takes. Having such a Table already calculated meets (or at least half meets) the objection often raised against these admeasurements, because of their liableness to inaccuracy, and this it does by limiting our chance of error. If, however, a measure be taken which is, for instance, *more* than Table gives it, it means that the figure has an extra size over the blade-bones, or else that the centre-waist point is more advanced than usual, in which case there is a longer surface for the tape to traverse from nape to waist.

So much for the Back Balance. The **Front Balance** is taken from and to the same two points, namely, the nape of neck and centre of waist, but in front of the arm and shoulder instead of at the back. The normal difference between the two being, in perfect upright models, three-quarters of an inch; the front being that much longer than the back. It would be unnecessary to give a separate Table for front balance, as anyone can make his own calculation mentally, and at once, by adding three-quarters of an inch to the balance quantities on the Table.

If the front balance is shorter than it ought to be when compared with its corresponding back measure, it indicates a stooping attitude. This, however, belongs to the subject of Reading the measures, and is dealt with in the section of Measurement in relation to Form.

The working out of the above Table will be at once recognised by those who remember their Euclid (Book I., Proposition 47) and their Algebra (Evolution). Either of the Examples may be regarded as a problem, and expressed algebraically thus:

N. Waist.	$\frac{1}{4}$ Waist Circumf.	Back Balance.
17	8	$\sqrt{17^2 + 8^2} = 18\frac{3}{4}$ inches (nearly).
18	9	$\sqrt{18^2 + 9^2} = 20$,, ,,

To the result a small addition has been made (from a quarter to half an inch, or thereabouts), as explained above.

The writer is not one of those who thinks that Tailoring can be reduced to mathematical exactness—certainly not; but that is no reason why assistance may not be obtained from the exact sciences when possible.

READY-MADE LISTS.

With the foregoing Tables of Average Measurements, and the full List of Rules, &c., as already given in detail, it will now be only necessary to supply a series of additional Tables showing the sizes which experience and practice prove are the most useful for Ready-made Clothing. For these the breast, waist, sleeve length and leg measure, with a few added items, will be sufficient, as the details can be obtained from previous particulars.

TABLE No. 13.

JUVENILE SUITS.

Age	4	4½	5	6	7	8	9	10	11
Size	000	00	0	1	2	3	4	5	6
Breast	22	22½	23	23½	24	25	26	27	28
Waist	23	23	23½	23¾	24	25	25½	26	27
Seat	23	23½	23¾	24	24½	25¾	26½	27¾	28½
Sleeve	17	18	19	20	21¼	22½	23½	25	26
Leg	7	8	9	10	11	12	13	14	15

TABLE No. 14.

MALES.—*Working List for Ready-Mades. Breast* 26 *in. to* 44 *in.*

Jacket.									Vest.		Trousers.			
Age.	Size.	Breast.	Waist.	Back.	Sleeve.	Scye.	Nat. W. Length.	Length.	Open-ing.	Length.	Leg.	Side.	Waist.	Seat.
9	4	26	25½	5½	23½	12½	12½	19½	7½	19	23	32	24½	28
10	5	27	26½	5¾	24½	12¾	13	21	9	20	24½	34½	25	29
11	6	28	27	6	26	13¾	13½	22	10	20½	26	36½	26	30½
12½	7	29	28	6⅛	27	14¼	14	23	10½	21	27	37½	27	32
14	8	30	29	6¼	28	14¾	14½	24½	11	22	28	38½	28	33
14½	9	31	29½	6½	29	15	15	26	11½	23	29	40	29	34
15	10	32	30½	6⅝	29¾	15¾	16	27½	11¾	23½	30	41	30	35
		33	31	6¾	31¼	16	16½	28	12	24	31½	43	30½	36
		34	31½	7	31½	16½	16¾	28¼	12¼	24½	32	43½	31	36
		36	33	7¼	32	17	17	29	12½	25	32	44	32	37½
		38	35	7½	32½	17½	17½	29½	12¾	25¾	32	44½	34½	40
		40	37	7¾	33	18¼	17¾	30	13¼	26½	32	45	36½	42
		42	39½	8	33½	19¼	18½	30½	13½	27	32	46	39	44
		44	42	8¼	34	19¾	19	31	13½	27½	32	46	41½	45

TABLE No. 15.

MEN'S COATS FROM 32 TO 50 BREAST.

Sizes.	Breast.	Waist.	Scye Depth.	Nat. Waist.	Fash'n Waist.	Mng. Coat length.	Lounge length.	Back.	Sleeve.	Front Scye.	Trousers.	
											Waist.	Leg.
1	32	28	8¼	16	17½	33	28½	6½	30	11¼	28	30
2	34	30	8⅝	16½	18	33½	29	6⅞	31	12	30	31
3	36	32	9	17	18½	34	29¼	7¼	32	12½	31½	32
4	38 ¼	34	9⅜	17¼	19	34½	29½	7⅝	33	13	33½	32½
5	40 ½	37	9¾	17¾	19¼	35	30	8	33½	13½	36½	33
6	42 ¾	39½	10⅛	18	19½	35½	30½	8⅜	33½	14	39	33
7	44 ¾	42	10½	18¼	19¾	36	31	8¾	34	14½	41	33
8	46	46	10¾	18½	20	36½	31½	9⅛	34	15		
9	48	50	11	18½	20½	36½	32	9⅜	34	15¼		
10	50	54	11¼	18½	20½	37	32	9⅝	34	16½		

The small fractional figures underneath the larger ones indicate the amount of Roundness for stooping figures.

TABLE No. 16.

COATS—AGRICULTURAL SIZES.

In some trades the following sizes have been preferred :—

Breast	...	36 ¼	38 ⅝	40 ⅞*	42 †	44	46
Waist	...	34	36	40	43	46	48

---

* Allowance for Round back.

† When Waist exceeds Breast it is not usual to allow roundness.

TABLE No. 17.

MEN'S SUITS.

Nat. Waist	Total Length.	Width at Back.	Sleeve Length. Cuff.	Breast.	Waist.	Scye.	Vest Length.	Leg.	Waist.	Seat.
12½	19½	5½	23½	26	25½	12½	19	23	24½	28
13	21	5¾	24½	27	26½	12¾	20	24½	25	29
13½	22	6	26	28	27	13¾	20½	26	26	30½
14	23	6	27	29	28	14¼	21	27	27	32
14½	24½	6¼	28	30	29	14¾	22	28	28	33
15	26	6½	29	31	29½	15	23	29	29	34
16	27½	6⅝	30	32	30½	15¾	23½	30	30	35
16½	28	6¾	31½	33	31	16	24	31½	30½	36
16¾	28	7	31½	34	31½	16½	24½	32	30	36
17	29	7¼	32	36	33	17	25	32	32	38
17½	29½	7½	32½	38	35	17½	25¾	32	34	40
17¾	30	7¾	33	40	37	18¼	26½	32	36	42
18½	30½	8	33½	42	39	19¼	27	32	39	44
19	31	8¼	34	44	42	19¾	27	32	41	45
19	31½	8½	34	46	44	20¾	27½	32	43	46½
19¼	32	8¾	34	48	46	21½	28½	32	45	48

TABLE No. 18.

MEN'S TROUSERS.

Standard or Regular Sizes—Waist Size exceeds Leg Length.							Slender Sizes—Leg Length exceeds Waist Length.					
	2	3	4	5	6	7		2	3	4	5	6
W.	30½	32	34	36	38	40	W.	31	32	33	34	35
L.	30	31	32	32½	33	33	L.	32	33	34	35	36
In the above, Leg Lengths range from 30 to 33.							In the above, all the Leg Lengths are beyond the normal.					

TABLE No. 19.

ANOTHER LIST.

Standard or Regular Sizes.							Quarter Sizes.						
								2¼	3¼	4¼	5¼	6¼	7¼
W.	29	31	33	35	37	39	W.	32	34	36	38	40	42
L.	30¼	31	31½	32½	33	33¼	L.	30	30½	30½	31	31	31
The Waist rises two inches each size. Leg Lengths range from 30¼ to 33¼.							The Waist rises two inches each size. Waist Size exceeds Leg Lengths.						

TABLE No. 20.

CROSS SIZES.

30	32	32	34	34	34	36	36	36	38	38	38	38	40	40	40	40	42	42	42	42	44	44	44	44
29	29	30	29	30	31	29	30	31	29	30	31	32	29	30	31	32	30	31	32	33	30	31	32	33

In the above, various leg lengths are given to the same waist size. For 38 waist and beyond four different lengths.

TABLE No. 21.

ANOTHER LIST.

Sizes.	1½	2¼	3¼	3½	4¼	4½	5¼	5½	6¼	6½
Waist	31	32	33	33	34	34	36	36	38	38
Leg	31	29	29	33	29	33	29	33	29	33

TABLE No. 22.

SHIRTS.

Shirts are said to be cut by the neck measure, or, that the neck determines their size. This, however, is only another way of saying that they are cut by proportion according to certain ascertained laws of growth. But as the neck and front, being most exposed, are their most important parts, it is convenient to determine them as stated. The following are approved measures:—

Neck.	Chest on the Vest.	Sleeve.	Length.	Neck.	Chest on the Vest.	Sleeve.	Length.
13½	30	32	34	16	40	36	39
14	32	33	35	16½	42	36½	40
14½	34	34	36	17	44	37	40½
15	36	35	37	17½	46	37	41
15½	38	35½	38				

NOTE. The neck increases one-fourth the amount of enlargement of chest.

NOTE ON NATIONAL TYPES OF FORM.

The whole tendency of present events—notable amongst which are, easy transition from place to place, and a consequent free intercommunion of nations—is towards the effacement of types of any marked character; still there are one or two features which may be noted.

On the Continent the Decimal system of measurement and coinage prevails in most if not in all parts. England isolated—not more by the "silver streak" which fringes its serried shores than by a strange independence of character—keeps to her own method, the inch and the yard, notwithstanding the admission that the reckoning in tenths is easier and more exact. The English inch is nearly equivalent to two and a half centimetres.

Now the normal figure in France and Germany (Fr., *moyenne*, or *normal;* Ger., *regelmässigen*, or *normalen*) is: for chest (Fr., *poitrine;* Ger., *oberweite*) 96 centimetres; for waist *(taille)* 84 centimetres. That is, the waist measure is one-eighth of breast less than breast measure. This agrees as to proportion with what is advanced on page 36, and with the TABLES, but gives a somewhat larger chest. The other ordinary measures are: natural waist, 44; back, 19, 5; elbow, 49; hand, 80; scye depth from nape, 32; front of scye 30.

In France it is a common thing to find the waists of men smaller relatively than in England. Braces are less used, and *ceintures* (waistbands) are more so. The typical Frenchman is more shapely than the Englishman: more expansive chest, waist more defined, larger hips. With the German we get a heavier type of form: the shoulders, hips and seat are larger. A recent order from the Army authorities of the Fatherland, in order to keep up the standard of form, insists that the chest measure shall not be less than half the total height.

As for America, it is so composite a nation that any distinct type has not been evolved, for the lank form known as "Brother Jonathan" can only be regarded as a caricature, and not even belonging to New England.

NOTE ON MACHINE WORK AND FORM.

Ever since the sewing machine was introduced into the clothing trades, the question of its fitness on the one hand, or its unsuitability on the other, has been discussed by those interested in the matter. The only point of this controversy which need concern us at present is whether, with machine work, an equal degree of style or form can be put into a garment. It is said that however excellent this kind of work may be it can never equal hand sewing, remembering that by hand sewing is meant all that artistic manipulation which marks the product of a first-rate tailor. In connection with this it should be remembered that machines themselves and the skill of machinists have both immensely improved. What was regarded as impossible a few years ago is now being done before our eyes. Little by little, step by step, all the old difficulties are disappearing, and what the coming age will soon bring no man can even dream of. Take, for instance, the mechanical productions of that largest of all sewing machine manufacturers—the Singer Company. Besides improvements in ordinary items such as tension, pressure, feeding, shuttle supply, &c., this firm sends out machines adapted to every kind of work. Some with two shuttles and two needles of any desired gauge for double-stitched edges. Some on the "oscillating shuttle" principle, ensuring very great swiftness. Ornamental stitching in decorative designs of almost endless variety, modified at the will of the operator, is now successfully accomplished, as also crewel work in beautiful floral designs and variety of colour. No one who has actually seen what is being done by recent machinery, in any sort of work, from ships' sails and horses' saddles to the flimsiest muslin, and in the sphere of tailoring, outfitting, and dressmaking, has examined samples combining perfect sewing with a high degree of style and form, can doubt for a moment of the almost unlimited possibility of mechanism in the making of high-class clothing. All that is wanted is the guiding mind and taste of the operator—the machine follows easily enough. Towards the cultivation of the former a knowledge of Form-Growth contributes largely.

NOTE EXPLANATORY OF AN APPARENT CONTRADICTION IN SECTION XI.

It may be urged by anyone who takes the trouble to think the matter out, that to cut up the circumference of the figure into eight equal parts, and yet to locate one of the dividing lines at front of arm-hole, is unworkable—in fact, impossible. It becomes, therefore, necessary to make the point clear. In theory the Lateral line would fall *about midway* across the scye, but in practice it is more convenient to fix it at *front* of scye, as explained in the text. The difference, amounting from two and a half to three inches, is taken up in seams and ease allowance. So that the contradiction is apparent only, and arises from the essential difference between strict theory and its application in practice.

AUTHOR'S CLOSING NOTE.

The foregoing pages of this work are not to be considered exhaustive in respect to the subject dealt with. They contain some useful thought and some suggestive ideas—gleanings from the experience of several practical and efficient men; but the writer believes that there yet remains a large harvest of facts relative to the development and peculiarities of Form, which only need sorting, classifying, and arranging, in order that they may yield a result of much general utility, and may make it more possible to discern the footsteps of Law amid the apparent confusion of diversity. Thus fresh facilities will be given to meet the ever exacting demands of the times in which our lot is cast. For this future work of Form study, the Author again invites the co-operation of any of his readers who are gleaners of facts.

He would be glad, also, of any suggestions for making the book more useful.

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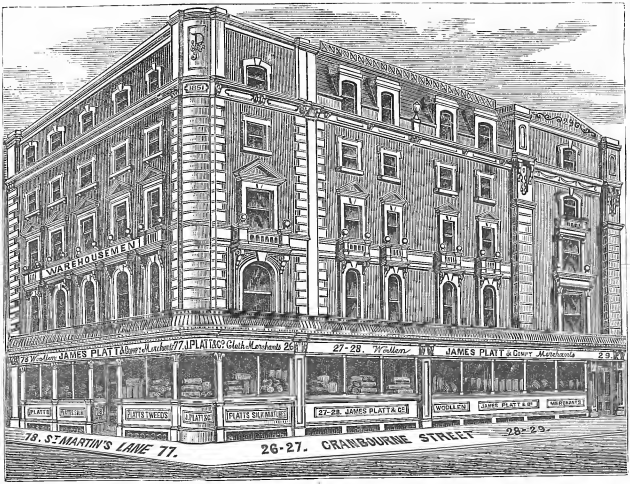
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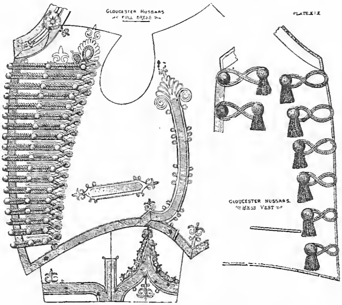

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